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UNITED STATES
DEPARTMENT OF THE INTERIOR

FINAL

ENVIRONMENTAL STATEMENT

Proposed
1972 OUTER CONTINENTAL SHELF OIL
AND GAS GENERAL LEASE SALE
OFFSHORE EASTERN LOUISIANA

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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L6843
1972

Prepared by the
Bureau of Land Management
Department of the Interior

Burl McCloskey
(Director)

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Summary

( ) Draft (x) Final Environmental Statement

Department of the Interior, Bureau of Land Management
Division of Marine Minerals

1. Proposed Oil and Gas Lease Sale, Outer Continental Shelf, Gulf of Mexico.

   (x) Administrative ( ) Legislative Action

2. Seventy-eight tracts (366,440 acres) of OCS lands are proposed for leasing action. The tracts are located offshore Eastern Louisiana. If implemented, this sale is tentatively scheduled to be held in late summer, 1972.

3. All tracts offered pose some degree of pollution risk to the marine environment and or adjacent shoreline. The risk potential is related to adverse effects on the environment and other resource use which may result from accidental or chronic oil spillage. Since the location of an OCS tract in relation to resources is an important consideration in assessing environmental risk potential, all tracts have been ranked according to their distance from shore or from high value/critically vulnerable resources.

4. Alternatives considered:

   A. Hold the sale in modified form

   B. Withdraw sale

      1) increased imports of oil, natural gas, and petroleum products
      2) increased onshore oil and gas production
      3) increased nuclear energy sources
      4) increased use of coal
      5) increased hydro-generated power
      6) modify FPC natural gas pricing
      7) modify market-demand prorationing
      8) oil shale production
      9) nuclear stimulation
      10) increased LNG imports
      11) synthetic natural gas
      12) Reduction in Demand
      13) Combination of Alternatives

   C. Delay Sale

5. Final statement made available to Council on Environmental Quality and the public on June 16, 1972.

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6. Comments were requested from the following:

Environmental Protection Agency*

Department of Commerce
National Oceanic and Atmospheric Administration*

Department of Transportation
U. S. Coast Guard*

Atomic Energy Commission*

Federal Power Commission*

Office of Emergency Preperedness*

State of Florida
Department of Administration

State of Louisiana
Commission on Intergovernmental Relations*
Department of Conservation*
Louisiana Wildlife and Fisheries Commission*

State of Alabama
Alabama Development Office

State of Mississippi
Coordinator for Federal-State Programs*

State of Texas
Office of the Governor*

Department of the Interior
Bureau of Sport Fisheries and Wildlife*
Bureau of Outdoor Recreation*
Bureau of Mines*
Geological Survey*
National Park Service*

* Comments were received from these offices and agencies

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Note:

This Final Environmental Statement has been prepared pursuant to section 102(2)(c) of the National Environmental Policy Act of 1969.

The regulations to which reference is made throughout this Statement, unless otherwise noted, are 30 CFR Part 250 and 43 CFR 3300, and Geological Survey OCS Order Nos. 1 through 12 - Gulf of Mexico. Although too bulky to append here, these may be obtained from the United States Department of the Interior.

The tracts which are being considered for leasing in this proposed sale are the same as those previously scheduled for leasing at the cancelled December, 1971 sale. In connection with the cancelled sale, a public hearing was held in New Orleans on September 8 and 9, 1971.

I. Description of the Proposal

A. Background of Proposal

For most of our history, a plentiful supply of energy is something the American people have taken very much for granted. In the last twenty years alone, we have been able to double our consumption of energy without exhausting the supply. But the assumption that sufficient energy will always be readily available has been brought sharply into question within the last year. The brownouts that have affected some areas of our country, the possible shortages of fuel that were threatened last fall, the sharp increases in certain fuel prices and our growing awareness of the environmental consequences of energy production have all demonstrated that we cannot take our energy supply for granted any longer.

A sufficient supply of clean energy is essential if we are to sustain healthy economic growth and improve the quality of our national life. I am therefore announcing today a broad range of actions to assure an adequate supply of clean energy for years ahead... 1/

President's Clean Energy
Message June 4, 1971

The President's Clean Energy Message alerted the nation to the possibility of insufficient supplies of clean energy unless prompt action is taken.

A series of measures were proposed which were intended to help meet the challenge. These measures involved action on several fronts, including: increased research and development on the more promising energy concepts such as the fast breeder reactor, coal gasification and sulphur-oxide control; the balancing of environmental and energy needs through long range power plant siting and a sulphur-oxide emissions charge; increased emphasis on energy conservation through public education; an expansion of our supplies of nuclear fuels through increased plant capacity; (placing the responsibility for energy management in one agency, a Department of Natural

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1/ U. S., President, "The President's Message to the Congress, June 4, 1971," Weekly Compilation of Presidential Documents, Vol. 7, No. 23, June 7, 1971, pp. 855-866.

Resources); and, by making available the energy resources of Federal lands.

In order to carry out one segment of this program the development of the energy resources of the Federal lands, the Department was directed to accelerate the offerings of OCS oil and gas leases and to publish a five-year schedule of lease offerings. This mandate was followed and on June 15, 1971, a tentative schedule was released which includes an acceleration of lease sales to be held in the Gulf of Mexico and proposes holding public hearings on possible leasing in the Gulf of Alaska and the Atlantic sometime prior to 1976 (Attachment A). This schedule is currently being updated and revised by the Bureau of Land Management with considerable resource information being supplied by the Geological Survey and with the assistance of other Federal agencies. The Department, in its current revision of the supporting analysis for the schedule, is further improving its data and applying more sophisticated analytical tools, e.g., the use of a computer model, to allocate projected gas supplies on a regional basis.

In establishing the tentative five-year leasing schedule the Department considers three primary factors: orderly resource development, protection of the environment, and receipt of fair market value. These three factors must be balanced against each other in each situation and in the overall schedule, and the consideration accorded to each factor may vary in each situation.

Orderly resource development is determined by an analysis in broad terms, of when, where, and how much oil and gas acreage to offer for lease. This is done through a review of the national energy situation and the

identification of future supply-demand imbalances. Projections were made of future non-OCS supplies of oil and gas, including imports which it was assumed would remain at a constant percentage of demand. Supplies from the OCS were treated by initially projecting future production from existing leases. Deficits were then identified by matching anticipated supply with future demand. These demand forecasts were made on a regional basis, using the regions of the Future Requirements Committee for gas and the Petroleum for Administration of Defense (P.A.D.) districts for oil.

Once deficits are identified new OCS sales are proposed to help meet these deficits. The impacts of alternative schedules on meeting demand are tested and one schedule is selected which can best satisfy this objective.

The schedule is also evaluated in terms of fair market value. The size and frequency of sales can induce or inhibit a competitive market which in turn affects the government's receipt of fair market value. Currently, in order to promote competition and sufficient capital for bonus payments and development of leases, two general sales of 300,000-600,000 acres each are scheduled per year.

After the schedule has been developed to reasonably assure the receipt of fair market value while attempting to meet deficits where possible, the schedule must be further evaluated and adjusted to assure maximum possible protection of the environment.

The tentative five-year schedule proposes that 10 sales be held in the Gulf of Mexico. The schedule indicates that if no sales are held in these areas by 1976, then sales of comparable potential reserves in other areas

will be offered.

Under the tentative five-year schedule, an environmental impact statement based upon detailed analysis of all appropriate data will be prepared for each proposed OCS oil and gas lease sale included in the five-year schedule. Detailed studies required to analyze environmental impacts of proposed OCS lease sales will be initiated soon for the Texas and Florida - Alabama - Mississippi areas of the Gulf of Mexico. An environmental analysis of the cumulative impact of OCS oil and gas operations is being initiated.

Prior to any decision to lease OCS lands in the Gulf of Alaska and Mid-Atlantic areas, broad planning studies of the environmental, natural resource, mineral, economic and other regional factors must be undertaken. Until the results of these studies, and others that may be necessary, are fully evaluated, no decision to initiate leasing programs in these areas can be made. In addition, the question of respective Federal and State OCS jurisdiction in these offshore areas is currently in litigation. Resolution of this litigation is necessary before a decision on leasing actions can be made.

The following general analysis of possible environmental impacts on the tentative five-year lease schedule has been developed for sales proposed in the Gulf of Mexico.

1. Proposed Sales

Sales tentatively included in the five-year schedule (excluding possible Gulf of Alaska and Atlantic areas) are:

1. Gulf of Mexico Drainage (held October 1971)
2. E. Louisiana General and Gulf of Mexico Drainage
3. Louisiana General and Gulf of Mexico Drainage
4. Texas General and Gulf of Mexico Drainage
5. Alabama, Mississippi, and Florida General and Gulf of Mexico Drainage
6. Louisiana and East Texas General and Gulf of Mexico Drainage
7. Gulf of Mexico Drainage
8. Louisiana and Texas General and Gulf of Mexico Drainage
9. Gulf of Mexico Drainage
10. Gulf of Mexico General and Drainage

2. Development

The following estimates indicate the intensity of development which will be required in order to develop the hydrocarbon reserves included in the five-year schedule in the Gulf of Mexico.

	Current Status	Increment: 1/ 5-year Schedule	1976 Status
a. Acres under lease (millions)	4.6	2.6 - 3.6	5-6 *
b. Reserves to be developed:			
- oil (bil. bls.)	2.0	2.5 - 5.0	
- gas (tril. cu. ft.)	37.0	20 - 40	
c. Remaining reserves:			
- oil (bil. bls.)			2.75 - 4.0
- gas (tril. cu. ft.)			35 - 45
d. Holes	9,924	3,500 - 4,500	13,000-15,000
e. Platforms	1,845	800 - 1400	2,300-2,800
f. Miles of Pipeline	5,044**	1,020 - 3,000	6,060-7,080
g. Terminals	72	14 - 28	86-100
h. Storage Facilities	82	16 - 32	98 - 114

* This assumes that some leases will have expired
** Includes approximately 3,100 miles of common carrier pipeline

3. Environment

The coastal zone of the Gulf of Mexico is richly endowed with estuaries and coastal marshes. Over 200 estuarine systems extend from Florida Bay and the famous Ten Thousand Islands of the Everglades to the hypersaline Laguna Madre of the Southwest Texas coast. It is estimated that there are about 12.7 million acres of estuary and coastal marsh habitat in the five states bordering the Gulf of Mexico. This is about 45 percent of the total estuary and coastal marsh area in the contiguous 48 states, about two-thirds of the coastal marshes and one-third of the estuarine water area. It is this area of shallow estuaries and marshes that makes the Gulf of Mexico so productive of fish and wildlife resources 2/

1/ All figures are for development over the life of the leases issued during the five-year period.

2/ U. S. Congress, Senate, Report of the Secretary of the Interior to the U. S. Congress, the National Estuarine Pollution Study, 91st Congress, Second session, March 1970.

From the shoreline of the barrier islands of the Gulf, waters deepen gradually at a rate of about six feet per mile out to depths of about 300 feet, where the gradient increases more rapidly out to the shelf break or continental slope. In some areas the shelf is more than 100 miles wide. The Gulf Coast area lies, generally, in a zone of transition between tropical and temperate weather patterns. The climate is mild (mean temperature 69 degrees F.) and the area receives considerable precipitation (55 inches annually). Wind flows are complicated, particularly in the cold months, when the normal track of disturbance traveling west to east lie near the coast.

The Gulf of Mexico is defined ecologically as a high energy system in which the naturally generated energy supply is sufficient to maintain a large and diverse population of plant and animal life. The extensive shallow water area of the Continental Shelf provides a broad expanse of nutrient laden substrate which tends to concentrate commercial species of fish where they can be caught readily.

a. Wildlife

The Gulf of Mexico offers wintering and nesting areas for a large proportion of the waterfowl population of the United States. It is the southern terminal for much of the Central Flyway and both the Mississippi and Atlantic Flyways. Twenty-five National Wildlife Refuges, including 486,780 acres are located in the area. These are distributed as follows:

	National Wildlife Refuges	Acres
Texas	5	131,333
Louisiana	5	232,476
Florida	15	122,971

In addition, 66,250 acres of wildlife habitat adjacent to the refuges have been closed to hunting by Presidential Proclamation.

Each State, including Alabama and Mississippi, also operates several wildlife reguges or management areas adjacent to the Gulf of Mexico.

b. Fishery Resources

The rich nutrient laden estuaries of the Gulf of Mexico produce an abundance of sport and commercial fish. Major species by type of estuarine dependence are: 1/

Sport Fish

Permanent Residence	Nursery Zone
Crabs, spotted sea trout, oysters, snook	croaker, tarpon, black and red drums, spot, mullet, sand sea trout, whiting, shrimp, flounder, salt water sheepshead, salt water catfish, blue-fish, ladyfish

Commercial Fish

Oysters, blue crabs, spotted seatrout, stone crab	same as above plus menhaden but not tarpon

c. Recreation

The Gulf of Mexico offers a wide variety of outdoor recreation opportunities. The resources of the area are summarized as follows: 2/

1/ The National Estuarine Pollution Study, op. cit., pg. 116.

2/ All statistics pertaining to outdoor recreation were taken from, Shoreline Recreation Resources of the United States, Outdoor Recreation Resources Review Commission, Report No. 4, 1962.

Florida

Florida's total recreation shoreline on the Gulf of Mexico is 1755 miles including 111 miles of public recreation areas and 771 miles of beach. Approximately half of the entire shoreline (840 miles) consists of mangrove swamps or marsh. All water oriented recreation activities are feasible in the area, but swimming and fishing are the most popular.

Alabama

Total recreation shoreline in Alabama is 204 miles including 115 miles of beach and 89 miles of marsh shore and only 3 miles of public recreation areas. Swimming, fishing, sailing, and boating are suited to the area and are the most popular recreation activities.

Mississippi

Mississippi's total recreation shoreline is 203 miles including 69 miles of marsh shore and 134 miles of beach. The Mississippi mainland shoreline lies some miles behind a widely broken chain of offshore islands (Petit Bois, Horn, Ship and Cat Islands), which protect the shore from the open Gulf. The area is best suited for such recreation activities as swimming, fishing, sailing, and boating.

Louisiana

Louisiana's total recreation shoreline (including Lake Pontchartrain) is 1076 miles including 819 miles of marsh shore and 257 miles of beach. Fishing, hunting, wildlife study, boating, and related activities are best suited to the area. Swimming is feasible but the nature of most beaches and offshore bottom make them less than attractive. 1/

1/ See also section I.E. "Recreation Resources".

Texas

Area available for recreation in the Texas coastal zone is 23.3 square miles, or 0.2% of the total land area in the coastal zone. 1/ This recreation area includes 343 linear miles of beach and 359 miles of marsh shore. The shorelines are probably as little developed as any beach areas in the United States. All water oriented types of recreation activity are feasible on the Texas shore.

National Park Service Units 2/

National Park Service units in the Gulf of Mexico area are:

Padre Island National Seashore
Gulf Islands National Seashore
DeSoto National Monument
Everglades National Park
Fort Jefferson National Monument

New areas which may be established by 1976 are:

Suwannee Wild and Scenic River
Jean Lafitte National Cultural Park
Wakulla River National Monument or Wild
and Scenic River

In addition to Federal areas, the following National Landmarks are

located in the Gulf of Mexico area:

Fort Morgan National Historic Landmark
Fort Walton Mound National Historic Landmark
Fort San Marcos De Apalche National Historic Landmark
Safety Harbor Site National Historic Landmark
Lignumvitae Key Natural Landmark

1/ Flawn, P. T. and B. Fischer. 1970. Land-use Pattern in the Texas Coastal Zone. in The coastal resources management programs of Texas, appendices. ed. by J. T. Goodwin and J. C. Mosely, Coastal Resources Management Program, Office of the Governor, Austin.

2/ Current data, National Park Service

4. Resource Use and Commercial Activity Related to the OCS in the Gulf of Mexico

The following major activities and resource uses occur on the OCS or are related to the OCS of the Gulf of Mexico.

a. Mineral Industry

The petroleum refining industry and the related extraction industries of Loisiana and Texas have a growth rate several times greater than the national rate for industries of this type. In 1971, Gulf of Mexico OCS operations produced 387 MM barrels of oil valued at $1,463,704,540 and 2.8 tr. cu. ft. of gas valued at $545,416,713. Total 1970 sulfur production on the Outer Continental Shelf was 1,099,548 tons valued at $24,636,736. In addition, 269,691 tons of salt was produced in 1970 with a value of $48,544.

b. Commercial Fishing

The Gulf of Mexico is one of the most productive fishing areas in the United States. In 1971, the commercial fishing catch was 2.097 billion pounds valued at $199.8 million (paid to fishermen). This catch was 42.2 percent of the volume and 31.0 percent of the value of the total United States commercial fisheries catch in 1971.

c. Sport Fishing

In 1970, an estimated 2.4 million fishermen, 12 years and older, spent 25.7 million man-days of fishing in the Gulf of Mexico. Approximately 53 percent of this sport fishing was in the ocean or beaches and 47 percent was in estuaries. 1/ No projections are available for 1976, but the 1970 level is expected to increase.

1/ Projected from 1965 National Survey of Fishing and Hunting and 1965 Salt Water Angling Survey; U.S. Fish and Wildlife Service, and preliminary 1970 Salt Water Angling Survey, National Marine Fisheries Service.

d. Recreation

In 1970, recreationists participated in 215 million recreation activity occasions [1/] in the Gulf of Mexico area; by 1975 it is expected that recreationists will participate in approximately 250 million recreation activity occasions in this area. [2/] Recreation activities in the Gulf area are, of course, largely water-oriented. Water-oriented recreation is the most popular form of outdoor recreation in the United States. The warm climate of the Gulf of Mexico makes this area very attractive to recreationists both in, and beyond, the region.

Estimated visits to National Park Service Units in the Gulf of Mexico are as follows:

	Estimated Visits	
	1971	1976
Padre Island	904,400	1,165,900
Gulf Islands	0	2,052,600
De Sota N. Mon.	135,500	161,600
Everglades	1,293,500	1,428,200
Ft. Jefferson	10,500	20,900

1/ A recreation activity occasion is the participation in a single activity by a single individual.

2/ The above estimates for recreation use are based on data and procedures contained in A New Perspective on Recreational Use of the Ocean, National Planning Association, Winslaw and Bigler. The above estimates are included for the purpose of presenting order of magnitude data and could be subject to considerable adjustment.

e. Shipping

The Gulf of Mexico is subjected to heavy shipping traffic. The following is an analysis of shipping traffic (daily distribution in the Gulf of Mexico)1/.

	All Vessels Over 100 GRT*		
Location	1969	1972	1980
Straits of Florida	19	27	21
Eastern Gulf of Mexico	17	19	17
Western Gulf of Mexico	9	6	10
Mobile Area	62	77	73
Ent. to Miss. R.	18	16	19

*Gross Tons

f. Defense Warning Areas

A possible restraint on the extent of future offshore oil and gas leasing involves conflicts in some areas between mineral development and high priority uses of the Department of Defense. Some adjustments in Defense "Warning Areas" (these are principally testing and training areas) on the OCS and/or development of adequate special oil and gas lease stipulations, where appropriate, will need to be made before mineral leasing in such areas can proceed.

g. Research and Education

Besides applied research in petroleum geology, ocean engineering, commercial fishing, fish farming, and other fields, a number of Gulf States colleges and universities are involved in basic research in

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1/ A Study of Maritime Mobile Satellites, Vol. I, - Merchant Vessel Population/Distributors Present and Forecast, Automated Marine International, Newport Beach California. Also see Attachment E of this statement.

the marine sciences. The shoreline and open waters of the Gulf of Mexico serve as an important outdoor laboratory. The following table lists colleges and universities, and degrees offered, that carry out part or all of their field education and research in the Gulf.

An example of this emphasis on field research in the Gulf involves the plans of Texas A & M University to establish Flower Garden Ocean Research Center. 1/ If plans are implemented 2/, the facility would be located in 80 feet of water about 120 nautical miles SSE of Galveston, Texas, and would be the world's first open ocean campus and America's first continental shelf laboratory. It would provide an ocean science capability in the Gulf to complement the existing strengths of Scripps Institute and Woods Hole in the Pacific and Atlantic Oceans. The facility would consist of an offshore platform with laboratory modules, living quarters, power generators, and support facilities. On the coral reef below, there would be placed a Tektite-type undersea habitat.

1/ Marine Biomedical Institute, Texas A & M University. 1971. The Texas Tektite Project: Flower Garden Ocean Research Center, Gulf of Mexico. Misc. brochure, Texas A & M University, Galveston. 21 pp.

2/ Texas A & M has filed an application with the Department of Interior for withdrawal of certain OCS lands for this specific purpose. The application is under review.

Gulf States and Colleges and Universities utilizing Gulf of Mexico for Research and Education

Institution	Location	Degree Offered
Florida Institute of Technology	Melbourne, Florida	B.S., M.S. in Physical Oceanography
Florida Presbyterian College	St. Petersbury, Florida	none, (several courses, student researcl
Flordia State University	Tallahassee, Florida	M.S., Ph.D. in Oceanography
Nova University	Fort Lauderdale, Florida	Ph.D. in Physical Oceanography
University of Flordia	Gainseville, Florida	M.S., Ph.D. in main departments with specialty in marine science
University of South Florida	Tampa, Florida	M.S. in Marine Science
University of West Florida	Pensacola, Florida	M.S. in Marine Biology
University of Miami	Miami, Florida	M.S., Ph.D. in Marine Sciences
Louisiana State University	Baton Rouge, Louisiana	M.S., Ph.D. in Marine Sciences
Texas A & M University	College Station, Texas	M.S., Ph.D. in Oceanography
University of Texas	Port Aransas, Texas	M.S., Ph.D. in main departments with specialty in marine science
besides Gulf States:		
University of Puerto Rico	Mayaguez, Puerto Rico	M.S. in Marine Science

5. Possible Environmental Impacts from OCS Oil and Gas Development Resulting from Implementation of the Five Year Lease Schedule

The environmental impact which could result from implementation of the five-year lease schedule can be estimated with precision only after specific factors related to each sale are known. For example, at least the following information is needed but is not immediately available for sales beyond the East Louisiana and, to a lesser degree, the Louisiana General Sale area: (a) location of tracts in relation to resources, shipping lanes, recreation areas, refuges, etc., (b) type of expected production, e.g., oil or gas, (c) geologic formations, (d) water depths, (e) expected terminal points for pipelines, and (f) expected size and location of required new storage facilities.

In general, it can be assumed that future impacts of OCS oil and gas lease sales, both favorable and unfavorable, will be greater on the environment, on other industries, and on communities in areas where no previous OCS oil and gas leasing has been undertaken. This is so because new pipelines and storage facilities must be built, relationships must be developed between existing industries, (e.g. fishing, and the oil and gas industry), and new labor forces and new payrolls will be introduced to the areas. In short, incremental impacts, both positive and negative, will be greater than for similar lease sales offshore Louisiana.

The general impacts expected to result from the implementation of the five-year schedule are expected to be similar to those described in this statement for the proposed East Louisiana OCS lease sale. The following table summarizes possible positive and negative impacts which could occur as a result of implementing the five-year lease schedule. More specific relationships cannot be

identified until detailed analysis has been completed for each of the proposed sale areas.

General Summary Of Environmental Impacts Which Might Result From OCS Oil And Gas Operations 1/

Impacted Factors	Impacting Factors: Debris	Platform	Oil Spill	Pipeline Const.	Storage Fac.	Support Service	Labor Force	Prod.
Refuges	(-)		(-)	3/	3/			
Estuaries	(-)		(-)	(-)				
Marshland	(-)		(-)	(-)	(-)	(-)		
Beaches	(-)	(-)	(-)	3/	3/			
Nat. Park Units	(-)	(-)	(-)	3/	3/			
Com. Fishing	(-)	(-)	2/	(-)				
Sport Fishing	(+)	(+)	2/	(-)				
Recreation	(-)	(-)	(-)					
Shipping		(-)						
Regional-Economy						(+)	(+)	(+)

1/ The principal type of relationship between impacting and impacted factors is indicated by (+) positive impact or (-) negative impact. In some relationships, both positive and negative relationships are possible; in these cases, the type of relationship considered dominant is shown.

2/ Impacts of oil pollution on deep water sport and commercial fish species are not well understood, but oil spills adversely affect this type of fishing.

3/ Impacts would be excluded by administrative action, e.g., pipelines or storage facilities would not be permitted in refuges, National Park units, or on those recreation beaches subject to official regulation.

B. Purpose of the Proposed Lease Sale

The U.S. is the single largest energy-consuming nation in the world, accounting for one-third of the world's total consumption. The growth in domestic demand for electric power and industrial demand for energy has caused a sustained high level of energy demand; from 1960 to 1970 demand increased at an average annual rate of 4.3 percent.

Overall Energy Requirements for the 15 Year Period 1970 to 1985 1/

	1970		1985	
	Quantity	Percent of energy supply	Quantity	Percent of energy supply
Coal (1,000 short tons)--------	526,650	20.1	850,000	16.7
Crude petroleum (million bbls)	5,367	43.0	8,600	35.6
Natural gas (billion cu. ft.)	21,847	32.8	38,200	29.5
Hydropower (billion kil. hr.)	246	3.8	363	2.6
Nuclear power (bil. kil. hr.)	19	0.3	1,982	15.6
		100.0		100.0

During the period 1970 to 1985, demand for total energy is expected to increase at an average annual growth rate of 4.5 percent. The demand for oil and natural gas during this period is expected to increase at a 3.2 and a 3.8 percent average annual rate, respectively.

1/ Secretary of the Interior, Statement before the Committee on Interior and Insular Affairs, United States Senate June 15, 1971.

In December, 1971, the Environmental Protection Agency promulgated national air quality standards from stationary sources for carbon monoxide, particulate matter, sulphur oxides, hydrocarbons, nitrogen oxides, and photochemical oxidants. The standards for sulphur oxides are particularly important to consideration of offshore oil and gas leasing in the Gulf of Mexico since this is a major potential source of relatively low sulphur fuels and has a potential for greater expansion.

Mr. W. L. Nelson, Technical Editor and Petroleum Consultant for the Oil and Gas Journal, explains in the August 17, 1970 issue that: "There is no accepted definition of what constitutes a low sulfur crude oil. Obviously, the higher-API-gravity crude oils contain less sulfur than low-API oils, but a 40-API crude oil that contains 0.3% sulfur is certainly not a low-sulfur oil, whereas a 20-API crude oil which also contained 0.3% sulfur would be a very low-sulfur oil." He then defines on the basis of the API gravity and percentage of sulphur of crude oils what constitutes low-sulphur oil and presents a table indicating that samples from offshore Louisiana fields were low-sulphur oils. Again, on p. 73 of the December 6, 1971 issue of the Oil and Gas Journal, Mr. Nelson presents a table of crude oils produced in the U.S. in 1969 which shows that 100% of the crude oil produced offshore Louisiana in 1969 may be classified as a low-sulphur variety.

In order to overcome the deficiencies in low sulphur fuel supplies without curtailing domestic energy consumption, it may be essential to develop as many low sulphur fuel sources and reserves as possible. Additionally, other actions are needed to develop methods of reducing the sulphur content of fuels, to control sulphur emission of consumed fuels, and to develop non-fossil fuel technologies. The President pointed out in his Clean Energy Message to Congress that, "A major bottleneck in our clean energy program is the fact that we cannot burn coal or oil without discharging its sulfur content into the air. We need new technology, which will make it possible to remove the sulfur before it is emitted to the air". Therefore, the availability of low sulphur petroleum products does not in itself assure that high air quality standards will be attained. However, sulphur extraction costs are lower if the sulphur content of the raw material is lower. This provides economic incentives to seek and use low sulphur fuels.

C. Location and Reserves

The sale area under consideration includes 78 tracts 1/ off the eastern half of Louisiana (from the Ship Shoal area East through the Main Pass South and East area). These tracts, if leased, would add 366,440 acres, an increase of about 10%, to the total of 3,783,423 acres presently under Federal lease offshore Louisiana. The area is 230 miles long with tracts ranging to 60 miles from shore. Three of the tracts are subject to drainage 2/; 39 tracts are in, or adjacent to, moderately developed areas 3/; and 36 tracts are wildcat tracts 4/. The proposed lease sale would be made under Section 8 of the Outer Continental Shelf Lands Act (76 Stat. 462 U.S.C. sec. 1337) and regulations issued under that statute.

Other tracts in the immediate area could have been included in this proposed sale but were deferred for consideration at this time because of potential risk to wildlife refuges. In the overall tract selection process potential conflicts with the shipping, commercial and sport fishing, and boating industries, Federal and State parks and beaches are all given consideration. In addition, an analysis is made of biological, oceanographic and meteorological data to select the least environmentally hazardous tracts for the proposed sale.

1/ The tracts are summarized by water depth, distance from shore, and expected type of production in Attachment B. Also, see attached map.

2/ Tracts subject to depletion of their oil and gas deposits from wells on adjacent tracts.

3/ Areas of current production.

4/ Tracts that are generally located five or more miles from tracts with established production.

Estimated Recoverable Reserves:

	Estimated Volume 1/	Estimated Market Value 1/ ($million)*
Recoverable Oil Reserves	825 million bbls.	2,900
Recoverable Gas Reserves	1.75 trillion cu. ft.	481

* 1971 dollar values

It is estimated that the proposed leases may produce 75,000-150,000 bbls. of oil per day and 200 - 400 million cu. ft. of gas per day by the sixth year after leasing. The average producing life of the leases will be about 20 years. 2/

Production from OCS leases in the proposed sale area during 1971 amounted to approximately 308 million barrels of oil and 1,060 billion cubic feet of gas. This production represented approximately 79 percent and 39 percent, respectively, of all oil and gas produced during the year from OCS lands in the Gulf of Mexico. In 1970, 10.29% of domestic U.S. oil production and 10.96% of domestic gas production came from the Outer Continental Shelf. 3/

This sale is tentatively scheduled to be held sometime in late summer 1972.

1/ U.S. Geological Survey, Informal Preliminary Staff Estimates, Undated, Unpublished.

2/ Ibid.

3/ See also Section VIII.B.2, "Onshore Oil and Gas Production", of this statement. Data for total 1971 U.S. oil and gas production were not available at the time this draft statement went to press. However, 1971 data should be available before the final statement is released.

II. Description of the Environment

A. Coastal Zone

The coastal area of Louisiana and Mississippi, shoreward of the proposed sale area, is one of the major estuarine/delta marsh complexes in the world, and certainly the major one of the United States. The fortunate combination of warm water temperatures, shallow depths, and the rich nutrient systems of estuaries and coastal marshes makes the Gulf of Mexico the most productive fishing region of the United States. The extensive estuarine coastal marsh areas are vital to fish and wildlife resources in providing a valuable source of food, nursery habitat for many species of fish and shellfish, and spawning areas for others. Similarly, food and shelter also are available in abundance for migratory waterfowl and other wildlife.

The Mississippi River for thousands of years has deposited sediment over the shallow waters of the Continental Shelf to build a large expanse of coastal wetlands, waterways, and estuaries that now reach almost to the edge of the Continental Shelf at the river's mouth, where the entire area is dominated by the Mississippi River Delta. Elsewhere, the adjacent marshes and estuaries are separated from the Gulf of Mexico by a system of barrier islands extending as an intermittent chain across much of the coasts of Louisiana and Mississippi. The combined estuarine areas of Louisiana and Mississippi include 3.9 million acres

of estuaries and 4.0 million acres of coastal marsh or 62 percent of the entire estuarine/coastal acreage of the Gulf of Mexico. This represents about 28 percent of the total combined estuarine/coastal marsh area of the entire contiguous United States.

Comparison of Marsh and Estuarine Acreage in the Coastal Zone Adjacent to the Sale Area (Louisiana and Mississippi) with that of the Gulf of Mexico and the Contiguous 48 States 1/
(Millions of Acres)

Habitat	Sale Area	Gulf of Mexico	United States
Coastal Marshes	4.0	5.7	8.2
Estuarines & Lagoons	3.9	7.0	20.1
TOTAL	7.9	12.7	28.3

Most of the estuaries are extremely shallow, being only a few feet deep, have a tidal range of about two feet and, for the most part, are relatively turbid because of the great volumes of sediment laden tributary freshwater received from the uplands. The transition of the estuaries and coastal marshes into the adjacent waters of the Continental Shelf is without clearly defined boundaries. This condition is essential to the survival of many of the living aquatic resources of the coastal zone which must occupy both the estuaries and the open waters of the Gulf of Mexico.

1/ Chapman, Charles R., "The Texas Water Plan and Its Effect on Estuaries," In: A Symposium on the Biological Significance of Estuaries. Sport Fishing Institute, Washington, D. C., March 1971.

B. Geologic Framework 1/

The continental shelf in the northern Gulf of Mexico extends over 100 miles off the Texas and Florida coasts, but becomes very narrow or absent off the Mississippi River where the delta has prograded 2/ across the entire shelf. The continental slope seaward from the Mississippi delta is smooth and continuous, and has the form of a cone (the "Mississippi cone") that flattens seaward, and extends southeastward to the Straits of Florida.

Terrigenous 3/ silt and clay mantle the area off the Mississippi delta. A seismic profile down the slope of the Mississippi cone, south of Mobile Bay, Alabama, shows that the prograded layers are truncated and a thin series of horizontal beds overlie the erosional surface. Another profile, down slope from the Main Pass area, shows irregularities interrupting the general structure which may be caused by gravity sliding or slumping. Both profiles show characteristic dome-shaped structures that are commonly bounded by faults. 4/ These are diapiric 5/ structures which are probably salt domes.

1/ Except where otherwise indicated, this section is largely from a report by E. Uchupi, and K. O. Emory, "Structure of Continental Margin off Gulf Coast of United States", Am. Assoc. Petroleum Geologists Bull., Vol. 52, July 1968, pp. 1162-1193.

2/ Shoreline showing a regular seaward movement due to sedimentation.

3/ Sediments derived from the destruction of pre-existing rocks on the earth's surface.

4/ A fracture, along which there has been relative displacement of the two sides parallel to the fracture.

5/ A structural fold in which a mobile core, such as salt, has injected or pierced the overlying rock.

The continental shelf west of the delta is blanketed by terrigenous sediments that grade from sand near the shore to silt and clay offshore. The sedimentary embankment which forms the continental margin off this area was formed by prograding and upbuilding, but it has been altered by the upward movement of domal masses or diapirs of salt or mud. The basin areas between these diapirs received sediment from the Mississippi and other rivers and from the growing diapiric structures that adjoin the basins.

During an earlier period (lower Cretaceous 1/) in geologic time, coral reefs were built, forming an organic barrier which almost completely surrounded the Gulf of Mexico. While the reefs were active, a thick sequence of shallow water deposits probably accumulated within the reef barrier. After the reefs died, sediment upbuilding and prograding formed the sedimentary embankment of the present continental shelf and upper slope.

The continental shelf in the northern Gulf of Mexico is one of the most productive oil and gas bearing areas in the Western Hemisphere.

The area of the proposed sale is on Federally owned submerged lands offshore Louisiana. There is a wide variation in the type of geologic structures which would be offered in this sale. Most of the obvious

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1/ The third period of the Mesozoic era, approximately 135 million years ago.

structures, such as shallow salt domes, 1/ have been leased in previous sales. Geophysical data indicate 34 separate structures or areas of possible hydrocarbon traps widely dispersed over the sale area. The majority of the structures in the lease area are a variety of deep-seated shale domes 2/ and fault closures 3/.

Although the northern Gulf of Mexico is not now a seismically active area, both shallow and deep faulting have occurred. Sediments in the lease area overlying the potentially first productive formation are relatively thick, generally in excess of 2,000 feet. Further geological and geophysical data indicate that abnormal pressure zones are below 5,000 ft. in depth. 4/

The strata in the proposed sale area are represented by sediments thought to be favorable for the occurrence (and accumulation) of oil and gas. Potential producing horizones may be expected at depths between 3,000 and 20,000 feet. Of the 78 tracts, 17% are expected to be gas productive, 47% are expected to be oil productive, and the remaining 36% are anticipated to have both oil and gas potential.

1/ A structure resulting from the upward movement of a salt mass, and with which oil and gas fields are frequently associated.

2/ A dome or anticline composed of shale.

3/ Dislocation and closure by displacement of a once continuous bed of sediment through which oil may have migrated from a source bed.

4/ Based upon geological and geophysical data available to the Geological Survey.

C. Weather Patterns 1/

The northern Gulf of Mexico lies, generally, in a zone of transition between tropical and temperate weather patterns. The climate is mild (mean temperature 69 degrees F.) and the area receives considerable precipitation (55 inches annually).

During the summer and early autumn the Azores-Bermuda high pressure zone is the dominant atmospheric feature in the North Atlantic. This high pressure zone generates the prevailing tradewinds which drift westward over the Atlantic and Caribbean and into the Gulf of Mexico. Storms and tropical cyclones which are generated in the Gulf of Mexico, the Caribbean, or the equatorial Atlantic are driven toward the U. S. coastal areas by the trades during the warm season. Under certain conditions these disturbances increase in size, speed, and intensity until they become hurricanes, with winds reaching or exceeding 74 miles per hour. Most hurricanes occur in August, September, and October, but the six-month period from June 1 to November 30 is considered the "hurricane season" in the Gulf of Mexico.

During an average year, off the Gulf and Atlantic Coasts there are fewer than ten tropical cyclones, of which about six develop into hurricanes. Over the last 10 years, these cause in an average year, the death of 50 persons between Texas and Maine, and property damage exceeding $400 million.

1/ See, U. S. Environmental Science Services Administration (ESSA), Some Devastating North Atlantic Hurricanes of the 20th Century, Washington, D. C., 1970. Also, ESSA, Hurricane, Washington, D. C. U. S. Government Printing Office, 1969. Also see, U. S. National Oceanic and Atmospheric Administration, Hurricane Information and Atlantic Tracking Chart, Washington, D. C., U. S. Government Printing Office 1971. (NOAA/PI-70023)

In addition to the tropical cyclones, extratropical cyclones which may vary greatly in intensity occur in this area primarily during the winter months. These storms have attained wind speeds as great as 30 to 50 knots. They originate in middle and high latitudes forming on the fronts that separate different air masses. The Gulf of Mexico is an area of cyclone development during the cooler months due to the contrast in temperatures of the warm air over Gulf waters and the cold continental air over the United States. From August 1959 through April 1970, 90 such extratropical cyclones have passed within 120 miles of the Mississippi Delta Region and could possibly have affected the area.

A phenomena known as a "norther" is quite common in the area in question during the winter months. A norther occurs when cold, polar air moves southward from the cold interior of the North American continent out over the warm waters of the Gulf. This unstable cold air mass, when heated from below, develops strong gusty northerly winds with considerable cloudiness and showers. During a typical winter as many as 30 such cold outbreaks reach the Gulf coast. The majority of these cold outbreaks, spilling out over the Gulf, produce winds in the 15-20 knot range but approximately one third of these cold outbreaks have winds over 34 knots with approximately half of these being vigorous enough to reach 48 knots. 1/

The prevailing winds in the northern Gulf of Mexico are easterly (NNE-SSE) during the spring (March-May) and fall (September-December). In the summer

1/ Information obtained from Deputy Assistant Secretary for Environmental Affairs, Department of Commerce. (See letter dated May 15, 1972, Dept. of Commerce in section containing comments).

(June and July) winds blow from the southwest and northwest. During January, February, and August, winds from the east are only slightly more predominant than winds from the south to northwest. Monthly averages of wind velocities in the area over a four year period, range from a maximum of 13.1 mph in March to a minimum of 7.6 mph in June. 1/

The wind speeds and directions shown above are derived from averaged or resultant data 2/ and do not necessarily convey dynamic conditions imposed by local fronts, storms, or hurricanes.

1/ Scruton, P. C., "Oceanography of Mississippi Delta Sedimentary Environments", Am. Assoc. Petroleum Geologists Bull., Vol. 40,

2/ The single vector that is the sum of a given set of vectors.

D. Hydrography

Major water currents in the northern Gulf of Mexico are influenced principally by the deep water circulation which is dominated by the Yucatan Current. Circulation over the continental margin is governed by the loop current which turns clockwise after making the meridional transverse from Yucatan Channel towards the Mississippi Delta. The current may divide south of the delta and flow west and east or turn towards the east in its entirety. In either event, eddies having characteristic diameters of 62 miles, may be formed which migrate along the shoreward flank of the loop current. These eddies may be cyclonic (counter clockwise) or anticylonic (clockwise) and assert considerable influence on the direction and velocity of nearshore waters. The effects of the loop current on shelf and nearshore waters are more pronounced during the warm season than in the winter months. 1/

A report by P. C. Scruton, more pertinent to the near shore waters around the Mississippi Delta, describes a north directed, semi-permanent current south of the delta. 2/ He notes this semi-permanent current is modified by local conditions and that a strong relationship exists between wind speed and direction and surface current speed. He states current patterns around the Mississippi Delta "are extremely complex and are highly variable, both from place to place at any one time and from time to time at any one place". This conclusion is substantiated

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1/ Gaul, Roy, Circulation Over the Continental Margin of the Northeast Gulf of Mexico, College Station Texas, 1967, 172 pp. (Thesis, Ph.D.) Texas A&M University, Department of Oceanography.

2/ Scruton, P. C., Op. cit., p. 2905.

by a study prepared for the Environmental Protection Agency by Texas Instruments Incorporated regarding the movement of the 1969 oil spill from Shell Oil Company's Platform B, South Timbalier Block 26. This data illustrates a striking dependency of localized water currents on wind direction, velocity and duration. (See figs. 1 through 5, Attachment C.)

The discharge of the Mississippi River creates a "fresh water barrier" or rip tide around the major passes in the Mississippi Delta. The barrier is created by the fresh water from the river moving seaward and over-riding the heavier seawater. The barrier can stop or retard the movement of surface oil into the major pass areas. The freshwater barrier is subject to three major influences: quantity of Mississippi water flowing, wind 1/ and tide. Increased Mississippi flow promotes a strong barrier, while wind and tide either reinforce or hinder such a barrier, depending on their direction and force.

It is possible that if the surface layer were destroyed (i.e., if there were sufficient onshore winds and incoming tide), oil could be carried very close if not onto the delta in the areas of the major passes.

1/ Wind can contribute from 2 to 3 percent of its velocity to surface currents. It is also possible for wind to push an object or oil slick faster than the wind generated current or in a different direction due to slippage between laminar flow layers.

In extreme cases, it has been noted, with favorable winds and tides, and lower river discharge, surface currents would be directed upstream. 1/ On the other hand, it has been observed by Scruton that with a large river discharge of 880,000 CFS, with tides and river flow directed to the northeast, and with moderate southwest winds, the river surface layer dominated out a distance of about 20 miles off Pass-A-Loutre. 2/ While these two cases are extreme they illustrate the variability of the freshwater surface barrier. The normal conditions in the area support a continuous barrier around the delta area that can be broken down with a shift of wind, and/or tide but making it unlikely for oil to get into a major pass.

Under conditions of strong onshore winds, a turbulance is created where the onshore wind meets the offshore freshwater surface current. This turbulance, and the sedimentary load carried by the freshwater, could cause surface oil to be emulsified. In such a case, the subsurface shoreward currents existing under the freshwater surface flow could carry emulsified oil into the delta river system where it could be deposited onshore or washed back to sea by surface currents.

1/ Humphreys and Abbot, 1876 "Report Upon the Physics and Hydraulics of the Mississippi River", U.S. Engineers Prof. Paper 13, p. 617, (From Scruton, P.C. 1957, p. 2890).

2/ Scruton, P.C., "Oceanograph of Mississippi Delta Desimentary Environments", American Association Petroleum Geologist Bull., Vol. 40, December 1956, p. 2897.

It was noted by Scruton that at low river inside North Pass bar there was a current distribution of 1½ knots downstream on the surface and .2 knots upstream close to the bottom. 1/ The extent of the salt water wedge and two layer circulation ranges from negligible during high river discharge to extensive during low river discharge.

The effects of the freshwater barrier are weak between the major passes. In these areas, onshore winds could move surface oil to shore. Sub-surface currents in these areas flow seaward.

In conclusion, it can be said that the delta region is extremely complex and various conditions could exist which would either retard or assist the movement of surface oil toward the delta area. It appears that, on balance, conditions in this area provide a measure of protection of the delta area as documented by surveillance photography taken during the Chevron Fire - Platform "C" spill.

1/ Scruton, P. C., 1956, p. 2887.

E. Recreation Resources

Louisiana and Mississippi posses quality water-orientated natural resources which make them highly attractive for vacation and other outdoor recreation purposes. Louisiana has the longest shoreline of any Atlantic or Gulf Coast state except Florida. Even with an abundance of fresh and salt water, much of the shoreline is presently inaccessible or unsuitable for recreational use. The inaccessibility is primarily due to lack of roads, boat ramps, fishing wharfs and pier facilities.

The coastal regions of both State contain millions of acres suitable for outdoor recreation. In the coastal area of Mississippi, all except 12,000 acres are in public ownership. 1/ About 90 percent of the available beach areas of both states are along the Gulf of Mexico.

There are almost 2,500 islands of 10 acres or larger offshore Louisiana. Mississippi has 128 islands of at least 10 acres. 2/ The islands along the Gulf of Mexico Coast are used for outdoor recreational purposes but have remained undeveloped because of their isolation and because of threats from periodic tropical storms.

1/ State of Louisiana, "Comprehensive Outdoor Recreation Plan 1970-1975," Baton Rouge, June 1969. Also, State of Mississippi, "Statewide Comprehensive Outdoor Recreation Plan, "Jackson, 1969 and updated in 1970.

2/ U. S. Bureau of Outdoor Recreation, "Islands of America", Government Printing Office, August 6, 1970, pg. 62, Appendix I.

In 1970, 2.4 million people lived in the coastal area of Louisiana (including the city of New Orleans and the counties or parishes adjacent to the coastline) and over 300 thousand people lived in the coastal area of Mississippi. This represents 61% of the total population of Louisiana and 13% of the population of Mississippi. 1/

1. Federal Areas

The major Federally controlled outdoor recreation area in the Gulf of Mexico is the Gulf Islands National Seashore 2/, a new national facility extending over 150 miles along the coastline from Florida to Mississippi. The National Seashore includes Santa Rosa Island and the Eastern half of Perdido Key off west Florida. It also includes Petit Bois, Horn, and Ship Islands in Mississippi as well as the Davis Bayou area of the Mississippi mainland.

Historical sites of the Seashore consist of various coastal fortifications dating from early Spanish occupation. The area offers extensive opportunities for camping, picnicking, fishing, swimming, skin-diving, water-skiing, boating, bird-watching and beach-combing.

Current outdoor recreational use of the area is most concentrated in the vicinity of Fort Pickens State Park, Florida, and Fort Massachusetts on Ship Island, Mississippi.

1/ Louisiana and Mississippi Comprehensive Outdoor Recreation Plans, op. cit.

2/ Authorized January 1971, under P.L. 91-660 (84 Stat., 1967).

The Seashore is of prime outdoor recrsational importance to the seven state region of Florida, Louisiana, Arkansas, Tennessee, Mississippi, Alabama, and Georgia, containing 23 million people. More than 10 million people live within 250 miles of the National Seashore. It also is anticipated that many visitors from other States in the East and Midwest will be attracted to the area. Visitation is expected to exceed 3.5 million within five years after establishment, eventually increasing to 10 million annually. 1/

Other major Federal holdings in the coastal area of Louisiana are the Sabine, Lacassine, Delta, Shell Keys, and Breton Island National Wildlife Refuges.. While the major purpose of the refuges is to provide migratory waterfowl habitat, they also provide habitat for many other wildlife species as well as significant opportunities for recreation.

2. State Areas 2/

State owned recreation land along the coast in both Louisiana and Mississippi includes wildlife refuges and management areas, historic monuments and State parks. Wildlife Refuges are Rockefeller Wildlife Refuge and Game Preserve, Louisiana State Wildlife Refuge and Game Preserve, Marsh Island Wildlife Refuge and Game Preserve, St. Tammany Wildlife Refuge and Paul J. Rainy Wildlife Refuge and Game Preserve

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1/ Estimates of recreation use are by the National Park Service.

2/ Louisiana and Mississippi Comprehensive State Outdoor Recreation Plan, op. cit.

(private). State waterfowl and game management areas include: Bonne Carre, Biloxi, Pass-A-Loutre, Wisner, Bohemia, Pointe Au Chien and Salvador. The State of Mississippi manages Magnolia State Park, the Mississippi Coast Sand Beach, Fort Massachusetts and Cat Island. State-owned or private areas in Louisiana suitable for recreation include: Grand Isle State Park, the Chandeleur Islands (also part of the Breton Island National Wildlife Refuge), Fontembleau State Park, Fort Pike State Park, and Fort McComb State Park. State and private areas on Dauphine Island, Alabama are also suitable for recreation. Federal, State and private recreation and wildlife areas are summarized by acreage in Attachment D.

F. Wildlife Resources

The barrier islands, sounds, deltas, bays, marshes, and other wetlands of coastal Louisiana and Mississippi are important wildlife habitat, as are the adjacent forest and agricultural lands and the nearshore waters of the Gulf of Mexico. The coastal wetlands and estuaries harbor some of the largest concentrations of waterfowl, wading birds, colonial birds, and fur animals to be found in the Nation. The shallow coastal waters of the Gulf of Mexico are used extensively by diving ducks and colonial birds. 1/

1. Waterfowl

The coastal region of the Mississippi River is the southern end of the Mississippi Flyway. Waterfowl exist there in great variety and abundance, particularly between October and March when great concentrations of wintering birds are present. In 1971, the Winter Waterfowl Survey conducted by the Bureau of Sport Fisheries and Wildlife and the Louisiana Wildlife and Fisheries Commission estimated the population of waterfowl to be about 6.3 million birds: 4.1 million ducks, 1.7 million coots, and .5 million geese. This population includes over 1 million diving ducks which use the offshore waters of the Gulf of Mexico extensively. Peak populations of more than 1/2 million ducks and 150 thousand geese were observed on the National Wildlife Refugues of the area. Migratory

1/ Louisiana Wildlife and Fisheries Commission, Biannual Reports, Baton Rouge, 1970. Also, U. S. Department of the Interior, Assistant Secretary for Fish, Wildlife and Parks, "Interim Evaluation of Environmental Impact from the Chevron Company Fire and Oil Spill Off Coastal Louisiana, February and March 1970," unpublished report 9/19/70.

waterfowl support about 2 million man-days of local hunting annually. 1/

The migratory birds are protected by treaties with Great Britain (on behalf of Canada) and Mexico. The Migratory Bird Treaty Act of 1918 obligates the United States to preserve and manage existing populations of all migratory birds species. This responsibility is exercised by the Department of the Interior through the Bureau of Sport Fisheries and Wildlife in cooperation with the various States. The coastal area, particularly that portion associated with the Mississippi River Delta, is a key to the successful management of waterfowl under the Treaty by providing suitable wintering habitat at the end of the Mississippi Flyway.

2. Other Birds

Colonial birds, such as gulls and terns, use the offshore barrier islands extensively for nesting and feeding.

Wading birds in a great variety of species are found throughout the region. Many species winter in the area; some species are present only during the summer and nesting period; and others are year-round residents.

Shorebirds, e.g. willets, plovers, and sandpipers, nest on the offshore islands during the summer. Large populations of rails and gallinules nest in the marshes during the summer. Snipe are present in large numbers during the winter.

1/ Data based upon information made available by Bureau of Sport Fisheries and Wildlife, Department of the Interior.

3. Fur Animals

The coastal marshes of the Mississippi Delta support large populations of fur-bearing animals. Louisiana is the Nation's leading fur-producing State. During the 1969 season, 3,600 trappers caught more than 1.8 million nutria, muskrat, mink, raccoon, and otter; the pelts yielded about $6 million. An additional $1.1 million was received for the carcasses of nutria and muskrat. 1/ These fur-producing statistics are expected to remain approximately at current levels in the future.

4. Other Wildlife

Alligators, an officially recognized endangered species, song birds of many varieties, rabbits, and deer are found extensively throughout the entire coastal region.

1/ Louisiana Wildlife and Fisheries Commission, op. cit.

G. Fishery Resources

In 1971, Louisiana commercial fishermen harvested 1.396 billion pounds of fish and shellfish. This was larger than the catch of any other State and a record for Louisiana. A record commercial catch of .397 billion pounds of fish and shellfish also was landed in Mississippi. Much of the Mississippi commercial fish and shellfish catch comes from Louisiana waters or was nurtured in the Mississippi River Delta estuaries as juveniles. Louisiana and Mississippi fishermen received a record $86 million for this harvest in 1971. The average annual combined Louisiana-Mississippi commercial fishermen catch over the past 10 years has been one billion pounds. 1/

Many of the same resources that contribute to commercial fisheries also support a very large coastal recreation fishery for finfish, shrimp, and crabs. It is estimated that these provide 9.0 million man-days of sport fishing annually. Average recreational catches are estimated to be almost 6.0 pounds of finfish per man-day of fishing. Sport crabbing and shrimping yield even greater catches. 2/

The distribution and life history of the fish and shellfish of the Louisiana/Mississippi coastal zone vary between species but general groupings, with some overlap, can be identified. On the basis of these

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1/ U.S. Department of Commerce, NOAA, NMFS, Fisheries of the United States, 1971, (CFS-5900), March, 1972, U.S. Government Printing Office.

2/ Louisiana Wildlife and Fisheries Commission, op cit. Also, based upon information provided by the Bureau of Sport Fisheries and Wildlife, Department of the Interior.

characteristics, fishery species are classed as resident, semi-catadromous, or seasonal migrant. (These terms are defined in the following sections.)

1. Resident Species

Resident species complete their life cycle in estuaries and are dependent on this zone most, if not all, of the time. Oysters, blue crabs and spotted seatrout are classed as resident species although blue crabs and spotted seatrout may for a short time, venture into the shallow coastal waters. All three species contribute significantly to the commercial fishery, and spotted seatrout and blue crab are also sought by recreation fishermen.

Since the advent of offshore oil and gas activities, other resident species of the continental shelf have become concentrated around drilling structures. Among these are: red snapper, groupers, trigger fish, spade fish, giant sea bass, pompano, and many smaller species. Speculation that these species and other larger, seasonal game fish, such as sailfish and marlin, have appeared only since the offshore oil industry became active is erroneous. However, the platforms do create artificial environments which attract and concentrate many predatory species, providing favorable fishing sites for sportsmen and commercial snapper fishermen. While this intense concentration of species, in lieu of the more random distributional patterns, is considered in a favorable light by fishermen, the long-term effect on predator-prey relationships is not known.

2. Semi-Catadromous

Semi-catadromous species spawn in the Gulf of Mexico; the young

migrate to their estuarine nursery area, where they grow to sub-adults; then they return to the ocean where their life cycle is completed. Some species may return to the estuaries for short periods as adults. Major species include white shrimp, brown shrimp, menhaden, Atlantic croaker, spot, black drum, red drum, sand seatrout, southern flounder, and saltwater sheepshead. Most of these species contribute significantly to the commercial fishery and, except for menhaden, are also caught in great numbers by sport fishermen.

The Louisiana/Mississippi commercial fishery is, for the most part, a shallow-water fishery, i.e., 60 feet or less. Virtually all of the species caught are taken in coastal waters and in bordering estuaries.

Though many species contribute to the sport and commercial fisheries, two groups are of outstanding commercial importance: the shrimp and industrial fish, such as menhaden.

The shrimp spawn offshore, brown shrimp in waters as deep as 275 feet and white shrimp generally in waters shallower than 120 feet. Most commercial shrimping takes place in waters less than 60 feet deep and in 1970, of the 168,000 fishing trips recorded, 90 percent occurred in coastal waters less than 30 feet deep in estuaries. More than 70 percent of the almost 120 million pounds of shrimp caught were taken from waters less than 60 feet deep, and 56 percent were taken from waters less than 30 feet deep. The 1971 Louisiana shrimp catch amounted to 92.6 million pounds worth $43.3 million. 1/ Table 1 describes shrimp fishing and catches by water depths. 2/

1/ U. S. Department of Commerce, NOAA, Marine Fisheries Service, Fisheries of the United States, 1971. Washington, D. C., Government Printing Office 1972. (Current Fisheries Statistics CFS-5900). Catch poundage includes 200,000 lb. of freshwater shrimp.

2/ U. S. Department of Commerce, NOAA, Marine Fisheries Service Fisheries of the United States, 1970. Washington, D. C., Gov.'t Printing Office, 1971. (Current Fisheries Statistic (FS-5600).

Table 1 - Comparison Between the Proposed Area of Sale & Shrimp Fishing and Catches, 1970

Item	Water Depth in Feet for Coastal Louisiana and Mississippi									
	0-30	31-60	61-90	91-120	121-150	151-180	181-210	211-240	+240	Totals
Proposed Sale										
Number tracts	2	1	3	6	8	3	8	7	40	78
Miles from shore	11.5-12.6	23	9-10.5	8-36	10-43	3.5-24	5-53	10-49	45-69	
Acres (thous.)	10.2	5.0	9.0	25.3	40.6	12.8	36.1	32.5	194.9	366.4
% of total	2.6	1.3	3.8	7.7	10.3	3.8	10.3	9.0	51.2	
Shrimp fishing										
Number trips(1,000)	149.7	10.6	2.6	1.8	1.5	1.5	0.5	0.2	0.1	168
%	89.9	6.2	1.5	1.0	.8	.9	.3	.1	--	
Boat days (1,000)	70.6	24.3	8.9	7.0	5.9	6.9	2.5	0.6	0.2	126
%	55.7	19.2	6.8	5.5	4.6	5.4	1.9	.5	.1	
Catch (in millions of pounds*)										
Brown	34.7	4.5	6.3	5.9	5.1	6.9	2.9	1.0	0.2	67.5
White	29.5	14.7	3.7	0.4	0.2	0.04	0.02	0	0	48.6
Other	3.0	0.2	0.08	0.03	0.06	0	0	0	0.02	3.4
Total	67.2	19.4	10.1	6.3	5.4	6.9	2.9	1.0	0.2	119.5
%	56.2	16.2	8.4	5.3	4.5	5.8	2.4	.8	.02	
Pounds (per day) per boat	954	799	1,168	930	896	1,010	1,177	1,660	1,234	

* Catch figures are in round or live weights.

The industrial fishery (producing fish for meal, oil and pet food) is the largest volume fishery in the United States. Menhaden, accounted for more than 1.5 billion pounds of the total Louisiana and Mississippi catch in 1971, or about 83 percent of the total 1.8 billion pounds landed. 1/ Virtually all menhaden are caught in waters shallower than 60 feet, and much of the fishing takes place within State waters. In addition to menhaden, small croaker, spot, and seatrout, and several other species are caught and processed for industrial use, principally pet food. Most of these fish are also caught in waters shallower than 60 feet, although, particularly in the winter months, the fishery does extend into deeper water.

All of the other fish caught for food are harvested in relatively shallow waters, generally less than 30 feet deep, comprising the shallow nearshore Gulf waters and estuaries. However, fishery scientists of the National Marine Fisheries Service indicate that commercial fishing offshore Louisiana, and in the Gulf of Mexico as a whole, has peaked and in order to increase production in the future, it may become necessary to evolve substantial inshore aquaculture development, and to continue development of pelagic or high seas fisheries, i.e., the harvesting of species inhabiting waters deeper than those presently being fished.

3. Seasonal Migrant Species

The seasonal migrants generally reside in the nearshore waters of the Continental Shelf during the summer season, and some may forage briefly

1/ U. S. Department of Commerce, NOAA, Marine Fisheries Service Fisheries of the United States, 1971, Washington, D. C., Gov't. Printing Office, 1972. (Current Fisheries Statistics (FS-5900).

in the estuaries. They appear in late spring as the waters warm and depart as the water temperature declines in the fall. They either winter in the warmer offshore waters of the Gulf of Mexico or migrate to warmer coastal waters off Mexico or southern Florida. Some spend considerable time in the vicinity of the oil and gas platforms. Major species are the Spanish and king mackerel, tarpon, ladyfish and several species of jack, bluefish and cobia. Several of these, in other areas of the Gulf, are semi-catadromous. Other species found in the offshore waters include marlin, sailfish, wahoo, and a variety of tuna, sharks, skates and rays. At this time, none are important as major commercial species in Louisiana and Mississippi, but most are sought by recreation fishermen.

H. Oil and Gas Resources

The Gulf of Mexico is one of the most prolific oil producing areas in the world. Development of this area began in the late 1930's when the first offshore wells were drilled in the State of Louisiana waters. Presently, there are over 9300 completions producing oil and gas in Louisiana marshland and State waters.

As of January 1972, there were 5,956 wells with 8,990 completions capable of producing oil and gas in OCS areas of the Gulf of Mexico. Furthermore, 5,468 of these wells and 8,840 of the completions are offshore Louisiana. Over 1,800 platforms including single and multi-well structures, have been installed in OCS Gulf of Mexico waters.

It is estimated by the U.S. Coast Guard-New Orleans Office that there may be roughly as many as 1000 structures in Louisiana State waters from the shore line out to three nautical miles. However, because the State of Louisiana does not keep records on the numbers of offshore structures within their jurisdiction, it would be necessary to obtain from each company the number of offshore platforms it has in State owned areas in order to arrive at a reliable figure. This activity is presently being undertaken by the Geological Survey, but their survey was not yet completed at the time of this writing.

Production in 1971 from OCS lease areas in the Gulf of Mexico accounted for 387 million barrels of oil and 2.8 trillion cubic feet of gas with a market value of $2.01 billion. Since the inception of the OCS leasing program, the cumulative value of offshore production in the Gulf of Mexico through 1971 has been $10.39 billion.

In the future, as economics and technology permit, oil and gas development in the Gulf of Mexico can be conducted in deeper waters. In fact, deep water drilling operations are no longer experimental. Ocean bottom formations have been drilled Glomar Challenger in water depths of 20,000' without mishap. Industry today has drilled exploratory oil and gas wells safely in water depths to 1,497. Through this experience industry spokesmen have stated that oil and gas wells can be drilled safely in water depths to 2,000'. Meanwhile, engineering and technical advances are continuing at accelerated rates.

The tracts proposed for offering in this sale range in water depths up to 510 feet. Technology has been developed which will allow production of oil and gas in water deeper than any tract offered in this proposed lease sale while providing the most comprehensive and advanced safeguards ever employed.

I. Historical and Archeological Resources

The National Register of Historic Places was consulted and it was found that there are no historical sites listed within the proposed lease sale area.

Mr. Jared W. Bradley, Director, Louisiana Historical Preservation and Cultural Commission was also consulted concerning and historical sites in the proposed sale area that may not be recorded in the National Register. He said that the knew of "no unlisted structures of national historical significance in the area effected by the proposed lease sale." Dr. William G. Haag, Professor of Anthropology, Louisiana State University, was consulted concerning any archeological resources in the proposed sale area that might be effected in the event an oil spill should occur. He declared that "oil spills would not materially harm archeological remains in the area effected by the proposed lease sale."

III. Environmental Impact of the Proposed Sale

A. Possible Adverse Impacts of the Proposed Leasing Action

The area of production and transport is considered to be not only the proposed sale tracts, but also the adjacent marine and coastal areas of the Gulf of Mexico. Issuance of leases may have an adverse impact upon the environment in four principal ways: (1) debris from oil and gas drilling operations, (2) construction of platforms, and other structures, (3) construction of pipelines and (4) pollution from potential oil spills.

1. Debris

In the past, prior to the issuance of the present regulations, there have been indications that debris (as well as submerged structures) has damaged or interfered with fishing gear and imposed expense and lost time to fishermen. The present regulations governing oil and gas operations on the OCS (see Section IV, Mitigating Measures Included in the Proposed Action) strictly prohibit dumping of debris on the Shelf. Therefore, little or no impact on the environment from debris would be expected from the development of the proposed lease offerings.

2. Structures

At the present time, approximately 987 platforms and other structures, 4,341 holes with 5,942 oil and gas completions and approximately 2,700 miles of pipeline serving 29 receiving stations on shore are located in the proposed lease sale area from Ship Shoal through Main Pass South and East Additions.

It is estimated that approximately 70 to 120 additional man-made structures may be necessary to develop the proposed tracts. This would increase the present number of platforms in the area by 7 to 12 percent. The structures would remain for the productive life of a lease which averages about 20 years. Under existing regulations, they would be removed when production ceases.

Under some conditions, structures have an adverse effect on commercial fishing activities. The traditional fishing grounds are becoming less accessible to commercial fishermen because of the increasing number of platforms. Depending on currents and underwater obstacles, an offshore structure can remove substantial areas of trawling and purse seining grounds. Heavy concentrations of platforms often make trawling and purse seining difficult over large areas.

Of the 78 tracts proposed in this sale, 23 are located in water depths less than 180 feet and 3 are within 60 feet. Since approximately 72 percent of total shrimp are caught in water depths of 0 feet - 60 feet; and menhaden, 90 percent of Louisiana's fish catch by weight, is usually caught within the 60 feet isobath, no conflicts with commercial fishing would be expected from eventual development on most of the tracts proposed in this offering.

If a ship strays from established fairways, oil and gas platforms can pose a hazard to commercial shipping. This hazard, however, is minimized by the fact that fairways are well marked and well designated on navigation

charts. Directional drilling from outside shipping lanes is used to develop tracts lying partially in shipping lanes. Pertinent portions of the Federal Regulations (33 C.F.R., Sec. 209.135 (b), 1971), governing shipping fairways and anchorage areas are as follows:

> "The Department of the Army will grant no permits for the erection of structures in the area designated as fairways, since structures located therein would constitute obstructions to navigation. The Department of the Army will grant permits for the erection of structures within an area designated as an anchorage area, but the number of structures will be limited by spacing as follows: The center of a structure to be erected shall be not less than two (2) nautical miles from the center of any existing structure. In a drilling or production complex, associated structures shall be as close together as practicable having due consideration for the safety factors involved. A complex of associated structures, when connected by walkways, shall be considered one structure for the purposes of spacing. A vessel fixed in place by moorings and used in conjunction with the associated structures of a drilling or production complex, shall be considered an attendant vessel and its extent shall include its moorings. When a drilling or production complex includes an attendant vessel and the complex extends more than five hundred (500) yards from the center of the complex, a structure to be erected shall be not closer than two (2) nautical miles from the near outer limit of the complex. An underwater completion installation in an anchorage area shall be considered a structure and shall be marked with a lighted buoy as approved by the United States Coast Guard."

A survey of shipping traffic in the Gulf of Mexico shows that there is heavy daily usage of both the Eastern and Western portions of the Gulf by vessels of 100 gross tons or over. This information together with projected data for the years 1972 and 1980 is presented in Attachment E.

Platforms can also pose a hazard to commercial fishing boats and recreation craft which do not follow marked fairways for commercial shipping activities.

3. Pipelines

It is estimated that none or possibly one new trunk line to shore would be required to develop the tracts in this proposed offering if leases were to be issued. However, several offshore spur-lines and extensions of existing lines to new reserves would be needed. This information is based on extensive discussions between Bureau of Land Management personnel and all major pipeline companies together with oil industry representatives who are active in the offshore Louisiana area. The vast majority of companies, interviewed separately during the week of April 17-21, 1972, in New Orleans, agreed that due to depletions in present production sites, anticipated capacity of existing pipelines to shore would probably be adequate, combined with the above needs, and no major network of new trunk lines would be required.

The impact on the environment of pipeline installations resulting from this proposed sale, compared with past activities, would not be expected to be of major importance. However, because there is a chance that a pipeline to shore, in addition to spur-lines and extension lines, could be required, and because pipeline activities in the past resulting from OCS lease sales have had an impact on the environment, particularly in marsh areas, the following discussion is relevant to this proposed sale as well as to the overall problems associated with offshore pipeline installations in general.

The only practical method for transporting gas from offshore areas to onshore processing facilities is by pipeline. Oil, however, can be

transported to shore by either pipelines or barges. In 1966, over 20% of oil produced in the Gulf of Mexico was transported to shore by barges. Since that time, however, the more dependable and environmentally safer method of pipeline transportation has taken preference over barging oil to shore. For instance, in November, 1971, only 3 1/2% of oil produced in the offshore area was barged to shore, and the remainder was transported by pipelines.

One report states (in referring to commercial fishing) "offshore pipelines usually do not create a hazard if the construction is regulated to prevent exposed pipes on the seabed". 1/ In the area offshore Louisiana pipelines are generally buried or allowed to sink into the soft bottom sediments. When the dredging method is employed, pipeline installation would have a local temporary impact on certain marine species, particularly organisms attached to or living in the bottom sediments and species that feed through a filtering web which can become clogged by suspended sediments.

The impact of the pipelines would be greater in the coastal marshes and estuaries. As mentioned above, most, if not all, of the major pipelines on the Outer Continental Shelf have been beneath the ocean floor. Similarly, pipelines are usually buried in the estuaries, but in coastal marshes it is only possible to bury pipelines and back-fill the canals when bottom soil conditions are suitable to make such a process feasible.

1/ St. Amant, Lyle S., "Biological Affects of Petroleum Exploration and Production in Coastal Louisiana," Louisiana Wildlife and Fisheries Commission, December, 1970. p. 32.

In many instances, especially involving larger diameter pipelines, it is not possible, given the physical consistency of the substrate, to bury them. In these instances canals are dredged for pipeline emplacement.

Recent studies 1/ indicate that 16.5 square miles of marsh are being destroyed each year in coastal Louisiana by erosion, subsidence and construction. Much of this destruction is attributable to natural forces and to flood control measures on the Mississippi River which have interrupted the process of sediment transport and depositon which formerly built and stabilized the marsh lands. It has been estimated that approximately 13% (or 2.15 sq. miles per year) of annual marsh destruction can be attributed directly to canal dredging operations associated with the oil industry. By far the majority of land loss falling within this category can be attributed to access canals to site drilling rigs and is not related to offshore oil and gas development. No rig access canals will be cut as a result of OCS operations. Probably less than 3% of the 16.5 sq. miles annual land loss can be attributed to the direct construction of pipeline canals; some of which serve onshore production and others serve OCS production. Indirectly, however, all canal construction contributes to marsh land destruction caused by erosive wave action on exposed banks, accelerated drainage of freshwater and fostering salt water intrusion.

1/ Louisiana State University, Coastal Studies Institute and Department of Marine Science, "Geologic and Geomorphic Aspects of Deltaic Processes, Mississippi Delta System", Baton Rouge, La., 1970 (Hydrologic and geologic studies of coastal Louisiana, Vol. 1).

Dr. Gagliano of the Louisiana Coastal Studies Institute and other authorities who have studied the area 1/ have pointed out that there are other possible adverse effects related to pipeline construction which do not necessarily contribute to a land loss figure but which are nevertheless important to consider. For example, the destruction of vegetation in pipeline right-of-ways can alter the environment of the immediate area and contribute to an acceleration of the natural drainage process; pipeline construction can also cause destruction of waterfowl nesting areas within its path, but the spoil banks left after pipeline canal construction, when the back-fill method is not employed, often provide excellent habitat for wildlife; disruption of sessile animal habitats and other bottom resources will inevitably occur within the pipeline right-of-way.

1/ See particularly, Lyle S. St. Amant, "Biological Effects of Petroleum...", op. cit. pp. 21-23.

4. Oil Pollution

The fourth possible type of impact upon the environment is pollution from oil spillage. Oil spillage can occur in several different forms. It can take the form of a major oil spill of extreme proportions, such as that of the Chevron spill in early 1970, or in the form of minor spills, or perhaps in a series of such spills. Major efforts are being made to improve technology and equipment which will prevent spills as well as minimize pollution damage should a spill occur.

Both short and long term effects on the environment can be expected, either from a major spill or from a series of minor spills. The short-term effects of oil pollution, both obvious and subtle, may seriously damage the marine biological community in the area where the pollution occurs, whether it is in an estuarine zone or in shallow or deep waters. It is more conspicuous in estuarine and shallow waters, but the effect is also felt in deep waters. 1/

Damage from oil spills is obvious where adult organisms are affected, such as the destruction of waterfowl and marine birds through contamination of feathers or elimination of food sources, but detection of damage is often delayed when microscopic organisms and smaller life stages of larger organisms are affected. In the latter case, the loss of larvae of shrimp, oyster, fish, or other planktonic organisms, if severe enough,

1/ Blumer, M., "Oil Pollution of the Sea", Oil on the Sea, David P. Hoult, (ed.), Plenum, New York, 1969, pp. 6-12.

might reduce or eliminate a generation of major organisms. This is of particular concern if pollution occurs in shallow waters where these organisms reproduce and/or pass through their early life stages. 1/

In the deepest regions of the Gulf, owing to the comparative simplicity of the biological system, any pollutant introduced could have a pronounced impact although it might be buffered by the large volumes of water involved. Plant and animal life of the deeper regions are not as diverse as those found in shallower regions due to a combination of factors associated with the penetration of sunlight, nutrient supply, and temperature conditions of the deeper waters.

The full effects of spilled oil on the environment and its living resources at the various trophic levels are poorly understood at this time. Detailed studies are urgently needed in those areas having a long history of offshore leasing and which may be subject to low-levels of oil pollution resulting from a series of minor spills. In response to this need, the Bureau of Land Management is establishing a project to evaluate, on a continuing basis, the effects of oil spills from offshore oil and gas exploration and production in the Gulf of Mexico. This project will consist of a team of 15 people to be comprised of marine biologists, oceanographers, pipeline engineers and support personnel working out of New Orleans. They will initiate studies and compile data concerning the short and long-term impact of oil spills on marine biota as well as the environmental effects

1/ Goldacre, R. J., "Effects of Detergents and Oil on the Cell Membrane" Field Study Council, Supplement, Vol. 2, p. 131 (1968).

of pipeline constructions resulting from offshore operations. Although this project is expected to be in full operation by the fall of 1972, it will be some time before initial study results and data will become available for dissemination. This project will also be available for possible expansion of its activities into new areas where offshore leasing may be proposed.

Several major studies and reports have been done in recent years attempting to assess the effect of an oil spill in a marine environment. Findings from such studies have varied from conclusions that no permanent damage has occurred to conclusions that oil has done great harm both immediately and over the longer term. One report 1/, dealing with the 1969 oil spill in the Santa Barbara Channel, presents the results of a 12 month field study aimed at determining initial effects of the pollution and gaining insight into the longer term effects of pollution and rates of recovery and recolonization of the ecosystem. The study was complicated by three factors. First, the area is noted for natural oil seepage which made it difficult to obtain comparative data in regard to "normal" conditions in the area before or between the spills resulting from drilling activity.

1/ Straughan, Dale, Kolpack, Ronald L., et. al., Biological and Oceanographical Survey of the Santa Barbara Oil Spill, 1969-1970, Vol. 1 and II, Allan Hancock Foundation, University of Southern California, (Sea Grant Publication No. 2: 1971).

Secondly, the largest recorded flood in Southern California history occurred almost simultaneously with the spill resulting in large runoff of fresh water and sediments into the Santa Barbara Channel, creating reduced salinities, high sedimentation rates, and a probable increase in pesticide levels which washed into the Channel from citrus groves. The final complicating factor was the overall general lack of knowledge of the ecology of the area.

The general conclusions of the study were that the damage to the biota was not widespread but was limited to several species, and that the area is recovering. The study hypothesizes that "the biota of the area had a high tolerance to oil built up by almost continuous exposure to small amounts of similar oil from natural seeps over long periods". 1/

Further, "the presence of oil in the area may have resulted in a normally high population of oil degrading bacteria." 2/

Other factors relate to the final disposition of the spilled oil. It is stated that the slow solubility and surface floatation of the crude oil allows for the rapid loss of volatile compounds which reduce the potential toxicity of the oil. In volume two of the report, geological studies have revealed that "much of the oil deposited at the sediment-water interfaces was removed from the area of initial deposition and was retransported into deeper water." 3/

1/ Ibid., Vol. I, p. 411.

2/ Ibid., Vol. II, p. 343.

3/ Ibid., Vol. II, p. 343.

The report indicated that different types of oil will vary in this effect and that "A crude oil such as that found in Santa Barbara is far less toxic than a light refined oil." 1/

The hypotheses presented in the study, relating to oil tolerant species and oil degrading bacteria, may also be given consideration in the oil production areas of the northern Gulf of Mexico.

Another report directly relating to the area under consideration was an "Interim Evaluation of Environmental Impact from the Chevron Company Fire and Oil Spill Off Coastal Louisiana, February and March 1970". 2/ This report did not establish that the Chevron oil spill caused damage to the surrounding area. "Efforts to evaluate the environmental effects of the spill were generally limited to detecting immediate impact on commercial fishery species. Ecologically significant damage to the biota could have occurred and not been detected."

In public hearings held by the Department of the Interior in New Orleans on September 8 and 9, 1971, concerning a proposed oil and gas lease sale offshore Louisiana, Dr. John G. Mackin, marine biologist at Texas A & M testified that his study 3/ of the Chevron fire and oil spill of February and March, 1970 revealed:

1/ Ibid., Vol. I, p. 414

2/ U.S. Department of the Interior, Assistant Secretary for Fish, Wildlife and Parks, "Interim Evaluation of Environmental Impact from the Chevron Company Fire and Oil Spill off Coastal Louisiana, February and March 1970", unpublished report 9/19/70.

3/ Although we have requested a copy of this study on separate occasions, it has not been made available to us.

"One, the Chevron platforms 41-C fire liberated crude petroleum in the shelf and Bretton Sound areas to the northeast and east of the Mississippi Delta. Two, so far as can be determined none of this oil reached the shore or marsh. 1/ Three, no effects of the spill can now be detected so far as the biology communities are concerned. Four, no effect on the fisheries was found. Five, the spill did not destroy birds or wildlife as have some other widely publicized spills. As a peculiar fact, destruction of birds have not been a feature in any spill in Louisiana waters that I have any knowledge of."

On December 1, 1970, a blowout occurred on Shell Oil Company's Platform B in Block 26, about seven miles offshore South Timbalier Bay, Louisiana. According to a study of the fate and effects of the resultant 53,000 bbl oil spill, water-dispersable fractions (probably aromatic compounds) from the crude oil spilled were transported through the water column and deposited in sediments at least to depths of 90 feet. 2/ It was also established that these deposits become redispersed into overlying waters. Sediments near the platform were found to contain more than 4.5 parts per thousand of carbon tetrachloride (CCl_4) extractable hydrocarbons; at one mile, the concentration was about 300 parts per million (ppm), and between 50 and 100 pmm at a distance of four miles. Dispersants were used during the spill, although their effect on distribution of hydrocarbons is unknown.

1/ Geological Survey (GS) authorities indicate that on 2 separate occasions small amounts of oil did get on Brenton Island, but it was immediately cleaned up.

2/ Studies and Investigations of the Fate and Effects of the Shell Oil Spill, Platform B, Block 26, South Timbalier Bay- December 1970. A report prepared by Resources Technology Corporation, Houston Texas for the Environmental Protection Agency, Washington, D. C., January, 1972.

Faunal counts from bottom sampling were low in the vicinity of the platform with 13,000 organisms or less per square meter within a one mile radius. Faunal densities increased to 32,000 per square meter at two miles south of the platform and 48,000 per square meter at four miles north of the platform and steadily and markedly decreased at greater distanc

Benthic megafaunal 1/ counts from sediment samples taken by a grab 2/ significantly diminished from all directions as they approached the platform. A strongly inverse relationship between megafaunal density and concentration of CCl_4- extractable hydrocarbons was found.

Branchial filaments 3/ of three species of fish taken in the vicinity of the spill were found to be afflicted with loss of cells or "sloughing", and swelling as compared with fish taken from a control area (Aransas Bay, Texas). The authors point out that these studies are not conclusive with regard to the impact of petroleum fractions on fish because of the migratory nature of these animals; however, the observed damage indicates the need for further investigations under controlled conditions to establish direct cause-effect relationships and establish correlations with

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1/ "Benthic megafauna" are animals large enough to be seen without the aid of a lens or microscope, that live on or burrow within the bottom mud and sand.

2/ Device for quantitatively sampling bottom mud and sediment, consisting of a pair of heavy metal jaws that are held open as the grab is lowered to the bottom, snap shut upon impact or by dropping a "messenger", and enclose an intact portion of bottom material.

3/ Anatomical structures on the gill arches that carry out oxygen/carbon dioxide exchange.

such alternatives as viral, fungal, bacterial or parasital contributions, including possible inducement by effects of oil.

Conclusions of this study which can be extrapolated to the entire Gulf of Mexico are few:

1. Both bottom surface dwellers and sediment burrowers are significantly diminished in numbers when the level of petroleum pollution in the sediment rises much above 100 ppm.

2. A significant amount of a water-dispersable petroleum fraction is redistributed from sediments into the water column and can subsequently be deposited in deeper, more distant sediments.

3. While nothing can be concluded about the effects of oil pollution on fish populations from this study, those individuals taken from the vicinity of the spill showed definite signs of damage to branchial filaments.

According to Geological Survey, oil was present on the water for 207 days following the December 1, 1970, fire and blow-out on the platform. This study was begun June 1, with field observations and collections being completed by June 10, 1971, or 192 days after the initial spillage. Therefore, this study is concerned only with the effect of oil pollution during the spill and cannot be used to predict long-term or recovery effects.

Interpretation of this study is rendered difficult because no base-line information on faunal density is available and the results are somewhat inconclusive.

Intensive petroleum exploration and production have gone on in this area for many years. In addition, the authors did not disclose the methods and rationale for biological sampling, leaving the reader unable to determine why only north, south, and northwest sampling transects were used, and where and how many samples were taken along the transects.

This study does, however, represent one of the very few objective, analytical investigations of the effect of oil spills in the Gulf of Mexico.

Another report which is based on over 20 years of investigation, observation and experimentation in the coastal and offshore areas of Louisiana expresses the following:

"While accidental pollution can be catastrophic, unsightly, costly and result in a considerable public outcry . . . we must recognize that . . . very rarely will accidental oil pollution have a gross permanent effect on the ecosystem." Moreover, "seldom is there significant fish or animal mortalities associated with oil spills".1/ However, the report does express a concern for the long range impact on the environment of sublethal pollutants and identifies the need for further studies in this area. 2/

1/ St. Amant, Lyle S., "Biological Effects of Petroleum Exploration and Production in Coastal Louisiana", Louisiana Wildlife and Fisheries Commission, December, 1970, p. 16.

2/ Ibid., pp. 29-30. See also Sec. VI of this environmental statement regarding St. Amant's concern for the effects of sublethal pollutants.

A more recent report 1/ discussed the results of a chemical and biological analysis of a relatively small oil spill (650-700 tons of number 2 fuel oil) which occurred in November 1969 off West Falmouth, Massachusetts, in Buzzards Bay. Unlike earlier studies on oil pollution in the ocean which were largely based on reports of the visible effects of the spillage, the Blumer study extended beyond the period of visible evidence.

The study reports that the contaminated region in Buzzard's Bay expanded steadily after the accident. Eight months after the spill, the pollution covered an area approximately eleven times that first affected. The oil destroyed marine life (95% mortality of adult organisms) in the immediate area of the spill within the first few days. As the oil spread out across the bottom of the bay it did not lose its toxicity. As of May 1970, eight months after the spill, contamination had ruled out commercial shellfishing in the nearby Wild Harbor River for at least two years, according to the report.

The study notes that, despite the low density of oil, it may mix with water, especially in a turbulent sea. Thus, the hydrocarbons can be dispersed through the water column and reach the sea bottom, particularly if weighted down by mineral particles. The hydrocarbon compounds are adsorbed by the bottom sediments and persist for long periods, killing larval organisms which settle on the sea bottom and in the marshes.

1/ Blumer, M., et.al., "A Small Oil Spill", Environment, Vol. 13, No. 2, March 1971, pp. 2-12.

In addition, revitalization of bottom areas will probably be further hampered by oxygen depletion caused by oxygen-requiring bacteria that degrade oil.

One of the conclusions drawn from the study is that the importance attached to the evaporation of toxic hydrocarbons has been overestimated. "It has been thought that many of the immediately toxic low-boiling aromatic hydrocarbons are volatile and evaporate rapidly from the oil spilled at sea. This has not been the case at West Falmouth (number 2 fuel oil), where the low-boiling hydrocarbons found their way into the sediments and organisms." 1/

In contrast, samples of Louisiana crude oil collected from an oil spill showed that as much as 16 percent of the volume of the spill evaporated within 500 feet of the platform, all in the lighter ends. It seems likely that at least 35 percent of the total oil discharged would have evaporated within 48 hours. 2/ It should be noted, however, that evaporation was facilitated because discharge from the wild wells sprayed high into the air under great pressure, where winds carried it for considerable distance before it fell to the water surface. The remainder of the oil would be left on the surface where it could be cleaned up, dispersed in the water column, and/or deposited on land or in sediments.

1/ Ibid., p. 11.

2/ U.S. Department of the Interior, Assistant Secretary for Fish, Wildlife and Parks, "Interim Evaluation of Environmental Impact From the Chevron Company Fire and Oil Spill Off Coastal Louisiana, February and March 1970", unpublished report 9/19/70.

Marine life may also be affected by efforts to remove surface oil. Emulsifiers, as well as natural storm action, remove oil from the surface by redistributing it as minute droplets throughout the water column. In this condition, oil is more susceptible to biological and chemical degradation, although in combination with such chemicals it also usually is more toxic. Furthermore, the oil treating chemicals themselves have been found to be more toxic than crude oil in many instances. 1/

Regulations and enforcement of standards to prevent oil spills are stronger today than ever, and are under constant review to identify improvements that may be made. Since Federal prosecution of regulation violations, it has become apparent that non-compliance can be very costly. 2/The greater efforts today exerted by both Government and industry to avoid pollution should decrease the instances of major oil spillage. The possibility of such spills, however, cannot be ruled out. Spillage has been categorized in three main ways: minor spills from operations and unidentified sources; discharge of waste water contaminated with oil; and major accidents.

a. Minor Spills

During 1971, approximately 1261 minor spills 3/ involving 2226 barrels (42 gals./barrel) of oil were recorded from OCS oil and gas operations

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1/ See - Annex 10, p. 2, National Oil and Hazardous Materials Pollution Contingency Plan, August 1971, for a list of interim restrictions on the use of dispersants for pollution control.

2/ See section IV.E of this Statement concerning enforcement measures.

3/ For information concerning actions to be taken in the event of a spill, see section IV, G.1, "Contingency Action."

in the Gulf of Mexico. The majority of these spills (913) involved one barrel of oil or less. Three hundred and twenty-six of the recorded spills involved 1 to 15 barrels totaling 917 barrels. Only 22 spills exceeded 15 barrels of oil (1079) barrels). An additional 969 oil slicks from unidentified sources were sighted and are not positively related to offshore drilling. There is evidence of natural oil seepage in the Gulf of Mexico, which dates back to 1906 1/, long before oil development activities were initiated, and seepage still persists in oil prone areas.

b. Waste Water

Waste water can be a source of oil pollution. Waste water is that formation water which is produced from a reservoir along with the oil and separated therefrom by passing the production through separation and treating facilities. Additional treating facilities remove the entrained oil from the separated water but are not 100% efficient in removing the oil from the effluent water. The efficiency in removing oil depends on the physical characteristics of a particular oil, the percentage of water in the crude stream, the volumetric thruput and various other factors. After recognizing these characteristics, evaluating the state of the technology and effects of oil on

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1/ U.S. Department of the Interior, Fish and Wildlife Service, "Gulf of Mexico: Its Origin, Waters and Marine Life." Fishery Bulletin 89. Also see, Thomas C. Johnson, "Natural Oil Seeps In or Near the Marine Environment: A Literature Survey, "National Technical Information Service, (Dept. of Commerce: Washington, D. C.) March, 1971.

the environment, the OCS Orders have established a limit of the oil content in produced waste water to an average of not more than 50 parts per million or .005% (1/200 of 1%) prior to disposal into the Gulf. Periodically, samples are taken and subjected to laboratory analysis to insure that this average limit is not exceeded.

There are about 1800 structures in Federal areas offshore Louisiana producing approximately a total of 1 million barrels of oil per day but waste water is discharged from only about 224 of these structures. Total waste water production is about 420,000 barrels per day; 240,000 barrels per day are transported to shore and 180,000 barrels per day are discharged into the sea. The largest volume of waste water discharged at a single location is about 20,000 barrels per day. The decision to separate, treat, and discharge waste water on the platform or pipe it to shore depends primarily on whether or not space exists on the platform for separating facilities and if pipeline capacity is available. The oil content of waste water discharged in OCS operations in the Gulf of Mexico, which averaged 40.8 ppm in March, 1972 will contribute as much as 7.3 barrels of oil per day.

During 1971, approximately 16 barrels of oil may have been introduced into the ocean daily, either from minor spills, or waste discharge. Based on these figures, the estimated production of 150,000 barrels per day from the proposed sale might contribute an additional 2 to 4 barrels of oil per day from continuous pollution sources on the OCS in addition to spills from unidentified sources.

c. Major Spills

During the last decade, three pipeline accidents have resulted in the spillage of 173,000 bbls (the smallest of these spills was 6,000 bbls) of oil in the Gulf of Mexico. The largest of these occurred in October, 1967, when a ship dragging its anchor in a storm, broke a pipeline which lost 160,000 bbls of oil into the water. A little more than 24,000 barrels is estimated to have been recovered.

Over the past 10 years, 1.9 billion barrels of oil and condensate were produced from the OCS in the Gulf of Mexico. During this period, nine accidents involving drilling or producing operations resulted in the spillage of 96,300 barrels of oil (the smallest of these spills were 100 bbls).

An analysis by the Geological Survey of four OCS fires which resulted in large oil spills shows the extent of shoreline contact by oil resulting from those fires.

Fire (Date)	Spill on Water	Days duration of oil on water	Shoreline Pollution
Amoco (Oct. 1971)	400 bbls	56	None
Shell (Dec. 1970)	53,000 bbls	207	A. A sheen or heavier on 28 different places fo a short duration. (inclusive of B.) B. Slight accumulative oi oil on beach for a sho duration 7 places. C. Only on 21 days was ar oil reported on shore.

Fire (Date)	Spill on Water	Days duration of oil on water	Shoreline Pollution
Chevron (Feb. 1970)	30,500 bbls.	49	Oil accumulated on Breton Island Beach 2 different times for a short period of time and was cleaned up.
Galveston (May 1970)	1,400 bbls. from oil storage tanks on platform	2	Approximately 50 bbls. of oil on beach at Galveston for 1 day. Mostly cleaned up by end of that day. Totally cleaned up by end of third day.
Total exposure to Pollution from 4 spills		314 days	
Oil on beach for short duration			31 times
Total number of days which any oil was reported on shoreline			26 days

The volumes of oil in the minor and major spills and waste water discharges listed above are limited to OCS operations and do not contain volumes for spillages or discharges in State waters and marshes. Also not included are discharges from tankers, and, discharges into the world oceans from any source outside the Louisiana -U.S. continental shelf. In contrast with drilling and production spills, it is important to note that spillage from tankers and other commercial vessels is estimated to contribute as much as 22.82 million barrels of petroleum to the world oceans each year. 1/

1/ Blumer, M., Et. al., "A Small Oil Spill," op. cit., p. 3.

d. Pollution from Gas Condensates

The possibility of environmental damage, and the inherent risks associated with offshore petroleum production is closely related to the total volume of liquid pollutants which could be introduced into the marine environment. The degree of damage is also related to other factors such as seasonal variations in temperature, winds, currents, presence of birds, commercial fishing, and spawning activities, to mention only a few.

In addition to crude oil, an oil well in many cases, produces varying amounts of water or gas which may be associated with a particular reservoir or field. The total volume of crude oil produced varies considerably due to a wide assortment of physical characteristics related to the reservoir conditions and field development such as pressure, permeability of the strata and number of wells. In the OCS fields offshore Louisiana, daily production varies from 100 to 2,000 barrels of crude oil per well, with an average daily rate of 300 barrels per well.

The amount of petroleum liquids associated with gas production is also variable due to the characteristics of the particular gas reservoir or field. The total volume of petroleum liquids from a gas well, however, is less than that from an oil well. The amount of liquid produced from gas wells may be expressed as the ratio of gas to oil (condensates) produced (GOR). A well having a GOR of 15,000/1 indicates a production

ratio of 15,000 cubic feet of gas to 1 barrel of oil. Most wells with this production ratio or a lower ratio are usually considered as oil wells. Wells having a higher ratio are generally classified as gas wells and may be divided into the following two categories. For the purpose of this discussion, a ratio between 15,000/1 and 200,000/1 may be considered a "wet" gas well. Those wells with a ratio of 200,000/1 or higher may be considered "dry" gas wells. In this proposed action, all tracts identified for gas drainage have estimated GOR ratios of less than 15,000 to 1. Due to their high liquid condensate production, we view them as if they will be oil productive.

In the proposed sale area, data on the average production of condensates from gas wells is based on averages from producing fields. Daily condensate production from some of the larger "dry" fields (GOR - 200,000/1 and above) range from 1 to 17 barrels per well, with an average daily rate of 5 barrels per well. Daily condensate production from "wet" gas wells in the larger fields in the proposed sale area range from 40 to 160 barrels per well. Thus, the average liquid condensate production from gas wells is significantly lower than the average crude oil production from oil wells.

B. Some Positive Impacts of OCS Leasing

Due to the nature of an environmental statement the focus of concern and attention is on the possible adverse environmental impacts which could occur as a result of the proposed action. However, in order to provide some semblance of balance and perspective concerning an evaluation of the environmental implications of the proposed OCS sale, a discussion of some of the positive impacts, other than the overall national energy need, on the area concerned is presented below.

1. Offshore Structures

Offshore structures have a favorable impact on sport fishing activities by concentrating fish around the platforms and thereby increasing the average catch. Most of the sport fishing from platforms is undertaken within 30 miles from shore, although some sport fishing craft make overnight trips and can venture out much further. Offshore platforms also serve as aids to navigation, a source of assistance in emergencies and havens for small boats in storms. Platforms resulting from blocks leased as a result of this proposed sale could be expected to have a positive and favorable impact on sport fishing and small boat recreationists over a long period of time (at lease 20 years).

2. Regional Economic Impact

It is estimated that the positive impacts resulting from this proposed sale, in terms of wages, profits, taxes will be significant both from the direct exploration, production, transportation and processing of the mineral products as well as for support facilities.

Support facilities, which enable operators to contract for equipment or services without owning equipment or having "in house" services, include but are not limited to drilling rigs, workover rigs, work boats, crew boats, work barges, helicopter services, logging services, cementing services, parts and supply salons, catering services, pollution control equipment, rental equipment and many others.

Since the petroleum industry is one of the major industries in the Louisiana Gulf of Mexico area, the importance of the positive impacts of this sale on the regional economy is high. According to some estimates, over 67,000 people in South Louisiana are directly dependent for their employment on the offshore oil industry. The petroleum industry (combined onshore and offshore) supports a payroll in the state totalling over $600 million annually. In addition, it is estimated according to one report, "that industry has invested nearly $9 billion in offshore Louisiana and . . . will realize an overall seven percent return on these investments." 1/ Sales tax collections and other forms of revenue derived from the offshore petroleum industry and allied industries have had a marked impact particularly in areas such as Morgan City-Berwick-Patterson, Cameron Parish, and Lafayette on the regional economic infrastructure. School facilities, libraries, street constructions and municipal improvements and expansions have proceeded rapidly to keep pace with the growing population trend largely inspired over the years by the offshore oil and gas industry.

1/ U.S., Congress, House, Congressional Record, 92nd Cong., April 18, 1972, information submitted by Congressman Hale Boggs of Louisiana, pp. E 3890-3893.

C. Analysis of Environmental Risks to Resource Use

The possibility of an accidental oil spill occurring on any one of the potential oil producing tracts in this proposed lease offering from natural hazards, equipment failure or operator error would not be greater than that posed by any of the other potential oil producing tracts. Any development activity on any of the tracts would be within the framework of a known array of natural and operational hazards, any one of which could result in an oil spill. The probability of such an incident, based on occurrence of previous large oil spills on OCS lands, is low (12 spills of 100 barrels or more in 18 yrs.), but highly significant in terms of environmental mandates. As far as has yet been determined, the few previous large spills occurring in the Gulf of Mexico resulted in minimal damage. This may be attributed to favorable winds and currents during these particular spills, which tend to prevent oil from reaching vulnerable areas. 1/

The purpose of this section is to rank each of the blocks in the proposed sale on the basis of its proximity to high value/critically vulnerable resources. The distance from such resources constitutes a major factor in assessing the risk of possible oil development from OCS tracts.

A numercial risk level index is assigned to each tract, based on the distance of the possible production site to a high value/critically vulnerable area, such as a heavy effort commercial fishing site, spawning and nursery grounds, refuges, recreation sites, estuaries, marshes and wetlands.

1/ U.S. Department of Interior, Assistant Secretary for Fish, Wildlife and Parks, "Interim Evaluation of Environmental Impact from the Chevron Company Fire and Oil Spill off Coastal Louisiana, February and March 1970," unpublished report 9/19/70.

Close proximity of production tracts to such areas implies a low response time to implement adequate contingency measures, and assumes that, under normal hydrological and meteorological conditions, oil could reach the areas. The index used in this analysis ranges from 7 to 1. A ranking of 7 indicates that a tract is within 9 miles of a high value area; a ranking 5 indicates a distance of 10 to 19 miles between the tract and the high value area; a ranking of 3 indicates a distance of 20 to 30 miles between the tract and the high value area; and, a ranking of 1 indicates a considerable distance (greater than 30 miles) between the tract and the high value area.

In this analysis, with shoreward ocean current velocities of 0.5 knot 1/, oil spilled from tracts ranked 7 can be deposited on shore or on high value resources within 18 hours, and oil spilled from a tract ranked 5 could be deposited on shore or on high value resources within 20 to 38 hours. Therefore, to prevent damage from a spill from a tract ranked 7, oil containment and clean-up equipment would need to be brought into full use in less than 18 hours to assure protection of the high value resources.

All tracts on the OCS, regardless of the levels of liquid pollutant produced or distance from high value areas, will pose some level of risk to the environment if developed. In this proposed lease offering, tracts

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1/ The 0.5 knot value represents an estimate of the shoreward component of current velocities common to the area.

producing "wet" gas are also expected to produce oil; therefore, these tracts are analyzed as if they were oil producing tracts. All gas producing tracts in this proposed offering are expected to produce "wet" gas.

The following summary lists all of the tracts in the proposed offering.

Summary of Area and Block Analysis

Area and Block	Resources Affected	Potential Risk Level
Ship Shoal		
98 and 110	Commercial Fisheries (Ship Shoal)	7
160	Commercial Fisheries (Ship Shoal)	5
202, 320, 326, 338, 343, 344, 345, 359	Commercial Fisheries and adjacent coastal marshes and estuaries	1
South Timbalier		
195, 202, 217, 314, 315, 316	Mainland, marshes and estuaries	1
Grand Isle		
58	Commercial fishing, spawning and nursery grounds, estuaries and marshes	5
65, 67, 69, 76, 84	Mainland, marshes and estuaries	3
94 and 95	Mainland, marshes and estuaries	1
West Delta		
35-36E 1/2	Commercial fishing, spawning and nursery grounds, estuaries and marshlands	7
36W1/2, 68, 101, 113, 124, 143, 149	Commercial fishing, spawning and nursery grounds, estuaries and marshlands	5
154	Estuaries and marshlands	3

Area and Blocks	Resources Affected	Potential Risk Level
South Pass		
46, 47, 48, 49, 51, 52, 53, 56-57, 75, 76, 77, 78	Delta National Wildlife refuge, nursery grounds estuaries and marshlands	7
82, 83, 96	Nursery and spawning grounds, estuaries and marshlands	5
Main Pass		
60, 61, 138, 139, 140, 141, 146, 149, 150, 302, 303, 310, 311	Wildlife refuges, estuaries and marshlands of Breton and Mississippi Sounds, spawning and nursery grounds Gulf Islands National Seashore	5
304, 309	Wildlife refuges, estuaries and marshlands of Breton and Mississippi Sounds, Gulf Islands National Seashore	3
219, 220, 221, 222, 223, 245, 246, 247, 261, 262, 263, 280, 281, 282	Wildlife refuges, estuaries and marshlands of Breton and Mississippi Sounds, Gulf Islands National Seashore	1

D. Areas of Special Consideration

One area containing tracts included in the proposed offering has been identified as a potentially hazardous area. Production platforms which may be located in this area could be subject to damage from sediment movement and appear to pose a greater potential for pollution than the otherwise low probability associated with platforms on other tracts.

The area in question extends from South Pass to an area off Main Pass. A seismic profile off South Pass shows features which may have been caused by gravity sliding or slumping. The area is immediately adjacent to the main river passes where sediment deposition is most active. The delta slope is quite steep and is covered by a mantle of soft unconsolidated sediments, portions of which are considered to be unstable.

Recent hurricanes have caused large volumes of sediment to be relocated. During hurricane "Camille" in August 1969, two of the thirteen existing platforms off Main Pass were seriously damaged, evidently as a result of forces created by the movement of large areas of the unconsolidated sediment. Four platforms in State owned areas of Breton Sound were destroyed by Camille. 1/ However, the only reported incidence of oil on the water as a result of the hurricane was in Breton Sound, on a State owned lease.

1/ U. S., Army Corps of Engineers, Report on Hurricane Camille, August 14-22, 1969, New Orleans, Louisiana, May 1970, p. 115.

Unstable zones may be present on portions of several of the proposed tracts and a soil boring program has recently been undertaken to determine the presence and extent of the postulated instability. In addition, the Geological Survey is aware of potential hazards and has acquired 2,720 line miles of shallow focus high resolution geophysical data not only to identify problem areas but to provide an identification of those broad areas where platforms may be placed without fear of encountering these localized hazards.

For blocks in this sale, shallow focus-high resolution data indicates the following:

West Delta Area blocks offered:

No blocks with identified unstable bottoms. Good identification of slope increases.

South Pass Area blocks offered:

Good identification of some mud mounds, continuing deposition, and slope increases as well as location of a few old mud slides. One small area of potential mud slides in corner of one block offered. Some areas of unconsolidated sediments, a few areas of shallow faulting and a mud slide potential scattered over one block.

Main Pass Areas blocks offered:

Good identification of gentle bottom slopes. One block shows minimal areas of potential problem but safe areas for development exist over the block.

The Regional Oil and Gas Supervisor, Geological Survey, is aware of these

areas and will utilize all available data in approving or disapproving the design and location of platforms in tracts, portions of which may contain localized hazards such as mud mounds and unconsolidated sediments. Withdrawal of tracts in this area is not considered necessary on the basis of bottom sediments because safe development is possible if platforms are properly designed and located.

All blocks ranked five and seven in the Ship Shoal area included in this proposed offering are located in water under 42 feet in depth. Earlier sections in this report have shown that virtually all menhaden and other commercial fish and over 70 percent of the shrimp taken are caught in waters under 60 feet in depth. Therefore, to insure protection of this resource, the following stipulation is proposed for Ship Shoal, Blocks 98, 110 and 160 in the event these tracts should be leased:

"No structure for drilling or production may be erected within the leased area until the Regional Supervisor, Geological Survey, has found that the structure is necessary, on the basis of existing geologic and engineering data, for the proper exploration, development, and production of the tract. The lessee's exploratory and development plans, filed under 30 CFR 250.34, shall identify the anticipated placement and grouping of necessary structures, showing how such placement and grouping will have the minimum practicable effect on commercial fishing operations. The Regional Supervisor may decline to approve the installation of a structure at a site which he determines will unreasonably interfere with other uses of the area."

The following stipulation is proposed for all blocks ranked seven in the West Delta and South Pass areas, if they are leased, as a basis for providing additional resource protection. (Specific blocks are: West Delta blocks; 35-36 E½, and South Pass blocks; 46, 47, 48, 49, 51, 52, 53, 56-57, 75, 76, 77 and 78.)

"During all drilling and production activities on the leasehold, the lessee shall maintain, or have available under contract, adequate oil containment and cleanup equipment approved by the Regional Supervisor at a readily accessible site. Within twelve hours after the occurrence of a significant oil spill, as determined by the Regional Supervisor, the lessee shall have such equipment in use at the site of the oil spill, unless, because of weather and attendant safety of personnel, the Regional Supervisor shall modify this requirement. The lesses shall monitor all drilling and production activities either with personnel in the immediate field area or by remote surveillance methods. The proposed method of monitoring and any proposed changes thereof shall be approved by the Regional Supervisor."

The following twenty-two blocks proposed in this offering lie partially within shipping fairways and/or anchorage areas ans would be subject to the Federal regulations as presented in Section III. A.2 ("Structures") of this statement: West Delta blocks; 143, 149 and 154; South Pass blocks; 47, 48, 49 51, 52, 53 and 56-57; South Pass - South and East Addition blocks; 75, 77, 78, 82 and 83; and Main Pass blocks; 60, 61, 139, 140, 146, 149 and 150.

IV. Mitigating Measures Included in the Proposed Action

The Department has developed the following strategy for safe development of the mineral resources of the OCS.

Management of the mineral resources of the OCS will be conducted in such a manner as to cause these resources to make a significant contribution toward supporting the present and future National economy at a rate consistent with maximum possible protection of the environment, orderly and timely development of the resource, and receipt of a fair market value return to the Federal Government.

Reasonably safe development of oil and gas resources on the OCS can be achieved through strict enforcement of lease stipulations and obligations, (detailed in the OCS operating regulations and orders) and must be based on sound operating practices backed by effective contingency actions in the event that pollution occurs as a result of a natural disaster, human error, or equipment failure.

Research and development programs in exploration, production, transportation, containment and clean-up technology, which will provide greater safeguards for the environment, are being conducted by the Department of the Interior, other Federal agencies and private industry. As advances are made, OCS operating regulations and orders will be revised and the new technology applied to existing leases as well as new leases. Revisions of the regulations and formulation of lease stipulations may also result from the review of environmental impact statements by the agencies and the interested public.

A. Regulations

Regulations governing OCS oil and gas lease operations in the Gulf of Mexico are contained in Title 30, Code of Federal Regulations and OCS Order Nos. 1-7, dated August 28, 1969, Nos. 8-9, dated October 30, 1970, No. 11, dated December 11, 1970, and No. 12, dated August 13, 1971. Leasing regulations are contained in Title 43, Code of Federal Regulations. The regulations establish procedures and requirements to be followed in all stages of lease operations: exploratory and development, drilling, production, transportation (pipeline construction and operation) and abandonment.

A general description of operating requirements under the existing regulations follows:

1. Plans: Operating plans must be submitted by the operators and approved by the Geological Survey (GS) before each stage of operations is initiated (exploration, development, abandonment). Approval of all operations must be obtained prior to their commencement.

2. Operator Inspection and Testing: The operator is required to inspect all aspects of the safety systems at specified intervals, e.g., daily pollution inspection on manned facilities, "frequent" inspection on unmanned facilities, monthly test of check valves. Detailed records of inspections and tests are required.

3. Reports: The operator is required to report all spills or leakage of oil to GS without delay. He is also required to notify GS of any unusual condition, problem or malfunction within 24 hours. 1/

4. Safety Devices: Required safety devices include: Subsurface safety devices, high-low pressure shut-in controls, high-low liquid level shut-in controls, pressure relief valves, automatic fail-close valves at the well head, automatic fire fighting systems, automatic gas detector and alarm systems, and other safety devices on production equipment; high-low pressure sensing devices and automatic shut-in valves on pipelines; and blowout preventers, related well control equipment, and mud system monitoring equipment on drilling wells.

5. Waste Disposal: The lessee is prohibited from disposing into the ocean any oil (except that oil in produced waste water must average no more than 50 ppm) 2/, untreated waste material or other materials which may be harmful to aquatic life or wildlife. Any drilling mud which may contain toxic substance must be neutralized before it can be disposed of in the ocean. Drill cuttings and sand must be processed, and oil removed, before they can be disposed of in the ocean.

6. Site Clearance: When an installation is no longer needed for development of the lease, the well is plugged with cement and all casings and piling must be severed and removed to at least 15 feet below the ocean

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1/ 30 CFR 250.45
2/ OCS Order No. 8 (2.A.(5), Gulf of Mexico.

floor and the location must be dragged to clear the site of any obstruction.

7. Debris: Regulations and OCS orders prohibit the disposal of debris into the Gulf of Mexico. Solid waste must be either incinerated or transported to shore for disposal.

8. Contingency Plans and Equipment: The operator is required to have an approved plan for controlling and removing pollution which provides for:

    a. Standby pollution control equipment, including containment booms, skimming apparatus, and approved chemical dispersants immediately available to the operator at a land based location.

    b. Regular inspection and maintenance of such equipment.

The Oil and Hazardous Substances Pollution Contingency Plan, Gulf Coast Region is operative and has recently been revised and updated to agree with the National Plan[1/]. In addition, the Coast Guard is establishing the Gulf Coast Team of the National Strike Force (NSF) at the NASA Mississippi Test Facility, Bay St. Louis, Mississippi for the purpose of responding to oil spills in the Gulf of Mexico. The National Strike Force has been established in accordance with the Federal Water Pollution Control Act and the National Oil and Hazardous Substances Contingency Plan.

The Gulf Coast Team will consist of 13 men, will be capable of responding to incidents within 4 hours of notification by the appropriate District Commander, and is expected to be in full operation by early fall, 1972.

1/ See also IV.F. of this statement and discussion of the National Oil and Hazardous Substances Pollution Contingency Plan.

B. Special Stipulations

Leases for oil and gas exploration and development are subject to all OCS operating regulations and orders. Additionally, in some cases the lease may include special stipulations which are considered necessary for the protection of a particular resource. These stipulations can be designed to meet the needs of a particular resource, e.g., wildlife or waterfowl refuges, fishing areas, or certain recreation areas, etc., which might be quite sensitive to development of the lease. (Also see Sec. III.C, "Areas of Special Consideration" of this statement.)

C. Departures

A departure (waiver) from OCS orders or other rules of the GS Supervisor may be granted when such a departure is determined to be necessary for (30 CFR, 250.12 (b)):

a) the proper control of a well,

b) conservation of natural resources,

c) protection of aquatic life,

d) protection of human health and safety,

e) protection of property, or

f) protection of the environment.

For example, in the case of subsurface safety devices, a waiver may be granted only when the following technical conditions exist:

a) When artificial lift is required.

b) When the flowing tubing pressure at the wellhead is 100 psig or less.

c) When the subsurface device causes sand to plug the tubing or sand makes the subsurface safety device inoperative.

d) When well flow rate fluctuation or water production prevents a well equipped with a subsurface safety device from producing.

e) When the mechanical condition of the well does not permit the installation of a subsurface safety device or when such a device cannot be installed at the prescribed minimum depth of 1,000 feet or more below the ocean floor.

Any one of the above conditions could result in the need to grant a waiver, but in each case, it would be judged on its own merits by the GS Supervisor. Removal of a subsurface safety device without prior approval would be subject to punitive action in accordance with the OCS Lands Act, Sec. 5(a)(2).

These waivers are technically based decisions and are granted in situations only where expert judgment determines that better, safer operations would result from operations under the waiver. Generally, the granting of a waiver permitting removal of a subsurface safety device will improve production and make for good conservation management practices by avoiding waste of the natural resource.

D. Inspection

Evidence of compliance with the regulations and lease requirements is obtained through surveillance of the operations under the lease and enforcement of specific requirements. The inspection system of the Geological Survey includes: (1) review and approval of plans before each operating stage is initiated, (2) close review and follow-up as necessary, by GS inspectors, of all reports required of the operator by the regulations and orders, (3) on-site inspection and (4) aerial monitoring through the use of helicopters (operators are also required to inform each other of oil spills or other irregularities which they observe).

1. Operator reports: A comprehensive reporting system covering all oil spills and any unusual conditions (For example: reporting and investigation of a persistent oil slick from an unknown source such as a sunken ship or natural oil seep) is required by the orders and is a key factor in monitoring operations. Operators are also required to maintain records for GS inspection of required periodic tests of safety equipment. Compliance with reporting requirements can be assured only by periodic on-the-site inspection and aerial monitoring.

2. On-site inspection: During the course of drilling, all operations are inspected at least one time. Leases in certain areas or in a particular development stage may require more inspections to assure the achievement of safety objectives. GS has recently adopted a systematical inspection program and a more stringent enforcement policy. This has resulted in increased operator compliance along with greater coverage of production operations and better documentation of inspection results.

A program of intensive inspections is used on OCS leases, for example, periodically all available inspectors may devote a week to inspecting production platforms and drilling wells selected on a random basis; inspections during other periods are conducted on a regular basis with emphasis on operations believed to require special attention. The number of GS field personnel (inspectors) has increased from 9 technicians and 5 engineers as of January 1, 1970, to 24 technicians and 13 engineers as of January 1, 1972. During the period January 1 to December 31, 1971, these technicians spent 2,965 inspection days or 29,974 man-hours, and engineers 362 inspection days or 3,697 man-hours in the field. Detailed inspections were conducted on 1072 producing platforms in the Gulf of Mexico. Approximately fifty percent of these inspections were unannounced. Included in these inspections were 9,020 well completions. Also, during this period, 631 inspections of drilling rigs were made. As of December 31, 1971, there were 8,789 completions capable of producing oil and gas on OCS lands offshore Louisiana 1/ Approximately 80 drilling rigs are operating in Gulf of Mexico OCS waters at this time.

3. Aerial Monitoring:

"Fly-overs" of the OCS operating areas are programmed on a seven day per week basis by GS inspectors. Any indications of oil pollution or other noncompliance will be followed immediately by an on-site inspection.

During the period January 1 through December 31, 1971, 1,276 pollution surveillance flights were made. The six helicopters chartered by the Geological Survey for use of the inspecting personnel flew a total of 4,854 hours.

1/ This figure does not include service completions.

E. Enforcement

The enforcement policy is intended to: (1) reduce the incidents of noncompliance of lease requirements which may lead to loss of life, loss of property, or damage to the environment; and (2) maintain a uniform enforcement policy to be applied to all operations affecting OCS lands in the Gulf of Mexico. When, in the course of an inspection, a requirement pertaining to the prevention of oil pollution or any other safety hazard is found to be in noncompliance, the operation will be shut-in until it is brought into compliance. After a shut-in, the operation can only be resumed by authorization of the GS; in all cases, this requires reinspection or a waiver of the inspection requirement. Minor incidents of noncompliance may require only a warning that corrections be made within a week. The operation will be shut-in if the required corrections are not made.

Additional penalities for noncompliance are specified in P.L. 83-212, Outer Continental Shelf Lands Act, Sec. 5(a)(2). "Any person who knowingly and willfully violates any rule or regulation prescribed by the Secretary for the prevention of waste, the conservation of the natural resources, or the protection of correlative rights shall be deemed guilty of a misdemeanor and punishable by a fine of not more than $2,000 or by imprisonment, and each day of violation shall be deemed to be a separate offense." Also Sec. 5(b)(1) and (2) provide for cancellation of nonproducing and producing leases by notice subject to judicial review or appropriate judicial proceedings.

The following table indicates the number of inspections and enforcement actions taken during two separate periods. Minor incidences of non-compliance result in formal warnings while incidences of noncompliance of a potentially more hazardous nature result in well or platform shut-ins until the operation is in full compliance with regulations and orders.

Summary of All Inspections
July - December 1971

	No. Inspected	Available for Inspection
Drilling wells	421	394
Production platforms	771	1845
Well Completion	5928	9154
No. warnings issued		266
No. well completions shut-in		571
No. well completion hours shut-in		10,670 hrs.
Oil production lost or deferred during shut-in		70,296 bbls.
Gas production lost or deferred during shut-in		992,366,000 cu. ft.

Ratio of completions shut-in to well completions inspected ≐ .096

Summary of All Inspections
Jan. 1, 1972 - March 31, 1972

	No. Inspected	Available for Inspection
Drilling wells	232	206
Production platforms	249	1861
Well Completions	2188	9281
No. Warnings issued		148
No. well completions shut-in		62
No. well completion hours shut-in		1,050 hrs.
Oil production lost or deferred during shut-in		16,144 bbls.
Gas production lost or deferred		166,000,000 cu. ft.

Ratio of completions shut-in to well completions inspected = .028

The next table indicates specific items found to be in noncompliance during ten special inspections conducted over a 14-month period.

Basic pollution control items of production equipment in which malfunctions were detected during the February 1971 through March 1972 special inspections are as follows:

	Checked	Operable	Inoperable or not within acceptable tolerances	Percent Failure
Surface Safety valves	2977	2877	100	3.4
Flowline sensors	5280	5177	103	2.0
Check valves	2768	2578	190	6.9
Pressure vessels				
High pressure sensors	1313	1273	40	3.0
Low pressure sensors	1026	999	27	2.6
Low level shut-in	666	629	37	5.6
High level shut-in	512	491	21	4.1
TOTAL	14,542	14,024	518	3.6

Companies fined in District Court for failure to install subsurface safety devices in offshore oil wells during 1970 in the Gulf of Mexico are presented below. Each company entered a plea of nolo contendere. The maximum fine for violation of the Outer Continental Shelf Lands Act is $2,000 per count.

Chevron Oil Company	$1,000,000
Gulf Oil Company	250,000
Tenneco	32,000
Kerr-McGee	20,000
Mobile	150,000
Continental	242,000
Humble	300,000
Shell	340,000
Union of California	24,000
	$2,358,000

No data for direct comparision of pollution incidences for similar time periods before and after the current "more stringent enforcement policy" are available. However, experienced personnel, private and government, are aware that after public attention was focused on the oil spill at Santa Barbara in January 1969, there has been a great deal less oil pollution in the Gulf from normal oil and gas producing operations. The public awareness, concern, and demand to prevent pollution has been a major factor in the reduction of oil spills.

In the past, major events were catalogued, but less serious events were often not reported. Occasionally, some years ago, wells were even intentionally flowed into the water for short periods during clean-up operations. Sophisticated burning devices now consume this well clean-up oil without any significant air or water pollution. More automatic equipment is now in use to shut-in production whenever a leak occurs in pipeline or production facilities. These include but are not limited to to pressure sensors and high and low level controls. Drip pans are placed under valves, vessels, and the production system to prevent leaking oil from escaping into the waters of the Gulf.

New reporting and investigative procedures established in the last two years have increased manyfold the number of pollution incidences reported as well as the time spent by GS personnel in surveillance flights by helicopters in assuring proper documentation of pollution events.

F. Contingency Action

Oil spills will occasionally occur as a result of natural disasters, equipment failure or human error. In the event that such an emergency occurs, the following action will be taken:

1. In the case of any spill, the operator is required to initiate action to control and remove the oil pollution in accordance with his approved emergency plan. In any case, a spill or leakage of less than 15 bbls. requires a report from the operator as to the nature of the spill or leakage, why it occurred and what steps were taken to correct it. A spill of 15-50 bbls. must be reported by telephone immediately to GS and confirmed in writing. A spill of over 50 bbls, or one of any magnitude that cannot be immediately controlled, must be reported immediately to the Coast Guard and the Environmental Protection Agency as well as to GS.

2. If the operator should be unable to control and remove the pollution, the Regional or National Oil and Hazardous Substances Pollution Contingency Plan may be activated and the designated Federal onscene commander would take over control and clean-up operations at the operator's expense.

The Regional or National Oil and Hazardous Materials Pollution Contingency Pl was developed pursuant to the provisions of the Federal Water Pollution Control Act as amended (33 U.S.C. 1101). Section 11(c)(2) of that

statute authorizes the President, within sixty days after the section becomes effective, to prepare and publish such a Plan. The Plan provides for efficient, coordinated, and effective action to minimize damage from oil (and other) discharges, including containment, dispersal, and removal. The Plan includes (a) assignment of duties and responsibilities, (b) identification, procurement, maintenance and storage of equipment and supplies, (c) establishment of a strike force and emergency task forces, (d) a system of surveillance and notice, (e) establishment of national center to coordinate response operations, (f) procedures and techniques to be employed in identifying, containing, dispersing and removing oil, and (g) a schedule identifying dispersants and other chemicals that may be used in carrying out the Plan, the waters in which they may be used, and quantities which may be safely used. The Plan is to be revised from time to time as necessary.

Operation of the National Contingency Plan requires a nationwide net of regional contingency plans. Guidelines for that nationwide net are established in the National Plan. This Plan provides for a pattern of coordinated and integrated responses to pollution spills by departments and agencies of the Federal government. It establishes a national response team and provides guidelines for the establishment of regional contingency plans and response teams. The Plan also promotes the coordination and direction of Federal, State, and local response systems and encourages the development of local government and private capabilities to handle such pollution spills.

The objectives of the Plan are: to develop appropriate preventive and preparedness measures and effective systems for discovering and reporting the existence of a pollution spill; to institute promptly measures to restrict further spread of the pollutant; to assure that the public health, welfare, and natural resources are provided adequate protection; to provide for the application of techniques to clean-up and dispose of the collected pollutants; to provide for a scientific response to spills as appropriate; to provide strike forces of trained personnel and adequate equipment to polluting spills; to institute actions to recover clean-up cost; and, to effect enforcement of existing Federal statutes and regulations issued thereunder. Detailed guidance toward the accomplishment of these objectives is contained in the basic Plan, the annexes, and the regional plans.

The plan is effective for all United States navigable waters including inland rivers, Great Lakes, coastal territorial waters, and the contiguous zone and high seas beyond this zone where exists a threat to United States waters, shoreface, or shelf-bottom. Its provisions are applicable to all Federal agencies.

G. Research on Advanced Technology

GS is evaluating the advantages and disadvantages of using remote or surface controlled subsurface valves (hydraulically activated subsurface safety devices not dependent on well pressures) on the Gulf of Mexico oil and gas leases. It is also studying different kinds of fire control systems. EPA and Coast Guard are conducting research on containment and recovery devices (booms and skimmers). When the results of these studies, and any other similar studies so indicate, the requirement for use of better techniques and equipment will be incorporated into the OCS regulations and orders as appropriate. If incorporated, the requirements will be applied to all leases.

H. Geophysical Information

High-resolution geophysical data covering approximately 75% of the tracts to be offered for sale have been purchased and are being analyzed by GS geophysical personnel. These data, in the area of coverage, will provide definitive information on (1) thickness of the unconsolidated sediments; (2) structural configurations on shallow seismic horizons (300-500' below ocean bottom); (3) anomaly maps identifying sea floor anomalies, mud mounds, mud waves or potential slide areas, pipelines and other objects on the sea floor, and bore hole locations as interpreted from a combined analysis of several geophysical measurements; and (4) contoured water bottom maps.

I. Conservation Practices

The Oil and Gas Supervisor, in the interest of conservation, is authorized pursuant to the Code of Federal Regulations, to approve well locations and well spacing programs necessary for proper development giving consideration to such factors as the location of drilling platforms, the geological and reservoir characteristics of the field, the number of wells that can be economically drilled, the protection of correlative rights, and the minimizing of unreasonable interference with other uses of the Outer Continental Shelf. The Supervisor draws his authority from the following regulations and OCS operating Orders:

30 CFR 250.11 outlines in broad terms the Supervisor's authority to control development of the OCS, to protect the environment, and to obtain maximum economic recovery of mineral resources under sound conservation practices.

30 CFR 250.17 dealing with well spacing authorizes approval of well locations, platform locations, and list factors for consideration in this regard. 30 CFR 250.30 requires lessee's compliance with OCS Orders as well as general regulations and demands all necessary precautions to prevent damage, waste, and injuries.

30 CFR 250.34 requires the lessee to submit to the Oil and Gas Supervisor exploratory drilling plans, lease development plans and applications for permits to drill prior to these drilling programs. The Oil and Gas Supervisor utilizes well information such as electric well logs, core information from other wells previously drilled in

the vicinity of the proposed drilling program and geological and geophysical data and other pertinent reservoir information to determine the proper number of wells necessary for development.

30 CFR 250.50 grants the Director authority to demand pooling or unitization which the Secretary is authorized to require under the OCS Lands Act in the interest of conservation.

30 CFR 250.51 refers to the unit plan regulations 30 CFR 226 in regard to obtaining approval of units or cooperative agreements.

30 CFR 250.52 list purposes for which the Supervisor may approve pooling or drilling agreements.

30 CFR 250.16 authorizes the Supervisor to specify the permissible production of a well. Thereafter, OCS Order No. 11 establishes the production rate control at the Maximum Efficient Rate (MER) of the well or reservoir. MER is defined in OCS Order No. 11 as follows: "The MER is defined as that rate for each reservoir and each well which, if exceeded, would lead to avoidable underground waste through loss of ultimate recovery of oil and gas from that reservoir. It is dependent on the recovery mechanism operative for the current producing period, and is based on engineering and geological information."

J. Other Requirements

In addition to the Interior Department's requirements, the operator must comply with applicable navigation and inspection laws and regulations administered by the U.S. Coast Guard. These relate to safety of personnel and display of prescribed navigational lights and signals for the safety of navigation. Permits to install islands and fixed structures and the

drilling of wells from mobile drilling vessels must also be obtained from the U.S. Army Corps of Engineers, which is authorized by the Outer Continental Shelf Lands Act to prevent obstructions to navigation. The decision as to whether a permit will be issued by the Corps of Engineers is based on an evaluation of the impact of the proposed work on the public interest. Factors affecting the public interest according to the Corps of Engineers include, but are not limited to, navigation, fish and wildlife, water quality, economics, conservation, aesthetics, recreation, water supply, flood damage prevention, ecosystems, and, in general, the needs and welfare of the people. Pipeline construction must be in compliance with standards established by the Office of Pipeline Safety, Department of Transportation. The Department of Labor establishes Occupational Safety and Health Standards which are applicable to OCS operations.

Moreover, an industry--cooperative venture for oil spill cleanup measures is in the final stages of formation. This cooperative will be called the "Clean Gulf Associates" and will be open for membership to all producers, operators and lease owners in the Gulf of Mexico. It is envisioned that it will be able to ". . . meet any and all oil spill contingencies from producing operations anywhere in the Gulf of Mexico offshore the United States." 1/ Completion of the agreement leading to the creation of Clean Gulf Associates is expected momentarily and the organization is expected to be in operation prior to holding this proposed lease sale.

1/ Letter from Mr. E. O. Bell, Chairman, Offshore Operators Committee, to Mr. Burton W. Silcock, Director, Bureau of Land Management, dated March 9, 1972.

V. Unavoidable Adverse Environmental Effects

Unavoidable adverse effects from this proposed sale can be identified as follows:

A. Oil Pollution Effects on Marine Environment

Some oil pollution will occur from development of the proposed tracts if the sale is implemented. The recently strengthened regulations and operating orders are as stringent as technology allows at this time. Although increased Federal inspection and the large costs involved in controlling, containing and cleaning up spilled oil have combined to to generate an awareness of the necessity to improve the OCS safety record, no regulation or enforcement can guarantee that there will be no pollution from oil producing operations on the OCS. Natural disasters, equipment failure and human error could occur despite existing regulations and enforcement procedures. Federal standards will do much to widen the margin of safety on OCS operations, but they cannot guarantee there will be no oil pollution.

The marine environment is rich in both its variety and numbers of marine life. Pollution can affect, in varying degrees, all forms of marine plant and animal life from those that are lowest in the food chain to those at the top. The degree of pollution, duration, and the physical condition under which it occurs determine the extent of the impact. After pollution has occurred, a normal balance may be regained in a short period of time or the impact may be more severe and recovery may require a span of many years. Little is known of what effect the chronic incre-

mental discharge of oil, associated with normal drilling and producing operations, may have on the marine food web.

In any case, the normal "health" of the ecosystems is disrupted and a balance is lost during the period of recovery.

Shorebirds, waterbirds and migratory waterfowl frequently are the most obvious victims of oil pollution because they are likely to come into direct contact with it. Contamination by oil destroys the waterproof qualities of their plumage a condition from which they seldom recover, even when careful rehabilitation is attempted. Similarly, bird species are vulnerable if beaches and marshes become contaminated by oil, especially if vegetation and food sources are destroyed. In the northern hemisphere, hundreds of thousands of swimming and diving birds have perished from oil pollution during and since World War II, and marked reduction of some nesting populations of sea birds from such mortality has been documented. 1/ However, no such problem has been documented in the Gulf of Mexico as a result of oil spills.

1/ Aldrich, J. W., "Review of the Problem of the Birds Contaminated by Oil and Their Rehabilitation". Resource Publication 87. U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, 1970.

B. Pipeline Construction Effects on Marshes and Bottom Resources

As previously noted, approximately 97% of OCS oil production and all gas production in the Gulf of Mexico is transported to shore by pipeline. Only one and possibly no new trunk line would be required to move production of oil and gas from the tracts proposed for leasing in this offering to the Louisiana coastal uplands for processing or redistribution. However, any additional pipeline construction in marsh areas resulting from OCS operations could contribute to marsh destruction. The adverse effects may be either short-term or permanent, and may be minor or serious, depending on the methods employed in laying pipelines and their location. These effects can be substantially reduced with adequate planning and by using the most appropriate construction techniques. For example, pipeline corridors or existing pipeline canals should be used whenever possible so that adverse impacts are restricted to fewer locations. Where possible, pipelines should come ashore on elevated terrain to minimize damage to marshlands. Usually bulkheads are placed in canals to prevent salt-water intrusion and to maintain existing drainage and water-exchange routes. To protect oysters, pipelines are usually routed around major oyster reefs, and where shallow estuaries are to be crossed, the canal is usually backfilled; in many cases so are canals through marshlands.

Although all of these measures help to alleviate the problem, the impact of pipeline installation on the coastal environment requires the joint effort of many agencies and authorities for successful resolution.

Agencies having responsibility or jurisdiction over all or part of oil and gas pipeline installation or operation in coastal areas are: (1) Department of the Interior, (a) Bureau of Land Management--rights-of-way for common carrier lines and gas pipelines on the OCS, (b) Geological Survey--jurisdiction over producer owned gathering lines and flowlines on the OCS, (c) Bureau of Sport Fisheries and Wildlife--protection of fish and wildlife resources and their habitat through consultation with the Corps of Engineers in the process of issuing Federal permits in navigable waters; (2) U. S. Army Corps of Engineers--issues permits for construction (including pipelines) on OCS and in other navigable water; (3) Federal Power Commission--grants certificates of convenience and necessity prior to construction of interstate natural gas pipelines; (4) Interstate Commerce Commission--grants approval of the tariff rates for transportation of oil by common-carrier pipelines; (5) State of Louisiana--grants rights-of-way through navigable waters under State jurisdiction; and (6) Department of Transportation, Office of Pipeline Safety--establishes standards for pipeline construction, operation and maintenance.

At present, the cooperative effort between the Department of the Interior and the Corps of Engineers and State conservation agencies is responsible for minimizing the impact of pipeline (and other) construction in navigable waters of the United States. The Corps of Engineers, through authority of the Rivers and Harbors Act of 1899, (33 U.S.C. 403) asserts authority over and requires a permit for construction in all navigable waters of the United States. Offshore lands beneath navigable waters subject to the navigation jurisdiction of the Corps of Engineers are defined in the Sub-

merged Lands Act (43 U.S.C. §1301) and includes all lands permanentaly or periodically covered by tidal waters up to the line of mean high tide.

The Department of the Interior and its Bureau of Sport Fisheries and Wildlife has responsibility and authority under several statutes, including the Fish and Wildlife Act of 1956, the Estuary Protection Act, the Endangered Species Act, the Migratory Bird Conservation Act, and the Fish and Wildlife Coordination Act, to preserve, conserve, protect and enhance fish and wildlife resources and their habitat.

The Bureau of Sport Fisheries and Wildlife, with assistance from appropriate State and Federal agencies, including the National Marine Fisheries Service now reviews all applications to the Corps of Engineers for permits to construct pipelines in navigable waters and assesses their potential impact on fish and wildlife resources and the environment. When appropriate, the Bureau recommends to the Corps specific modification of project plans which are needed to reduce impact on these resources. Occasionally a project plan is so conceived that significant impact cannot be avoided, but at the same time, a satisfactory alternative may be available; in such cases, a recommendation that the permit not be issued would be appropriate. The Corps of Engineers has the authority under the Rivers and Harbors Act to condition or deny a permit on the basis of environmental considerations. 1/

Much of Louisiana marshlands outside of wildlife refuges are privately owned but those that are below the line of mean high tide are subject

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1/ See Zabel v. Tabb, 430 f.2d 199 (5th Cir. 1970).

to Federal regulation (as navigable waters) through application of the Corps of Engineers permit system. Significantly large areas of Louisiana's privately owned marshlands are below mean high tide and are interspersed with waterways or adjoin open tidal waters. Many private marshland owners require that certain protective stipulations must be met or construction methods employed before granting rights-of-way for a pipeline across their property.

Thus, Federal or State 1/ authorities or private marshland owners may require, depending upon circumstances and location, that a pipeline be buried, that canals be backfilled where possible, that bulkheads be erected to prevent saltwater intrusion, the kind of dredging equipment to be used, the inclusion of shut-off valves, specific placement or disposal of spoil or, in the case of a private landowner, that pipeline corridors be established.

The Bureau of Land Management has initiated a study to investigate the extent and character of damage to Louisiana coastal resources from pipeline construction. The second phase, or longer term portion of the study, will attempt to develop criteria for pipeline system planning for application in OCS areas which have not been subjected to extensive

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1/ The State of Louisiana, by Act 35 of 1971, (LSA, R.S, 51:1362), created the Louisiana Advisory Commission on Coastal and Marine Resources. This Commission is composed of representatives from the fishing, petroleum and transportation industries as well as the State Government. labor unions, and private conservation and recreation groups.

mineral development. High priority will be given to developing criteria for the protection of bottom and shore line resources in this study.

C. Structures in Conflict with Commercial Fishing

The erection of more structures on the OCS may affect commercial fishing operations. The impact from platforms can be kept to a minimum, however, by only allowing those structures necessary for proper development and production of the mineral resources, and by placing them with due regard to fishing operations.

The Regional Oil and Gas Supervisor considers the views of commercial fishing organizations such as the Gulf State Marine Fisheries Committee with regard to placement of platforms. The Supervisor also from time to time requests information from the Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service to be used in his decision-making process of approving or disapproving platform installation. Within the constraints of location of the reservoirs and the technology necessary to drill directional wells, the Supervisor is mindful that platform location is an important consideration for commercial fisheries and does make decisions to minimize the impact of platform location on the commercial fishing industry.

D. Oil Pollution Effects on Recreation Resources

A major spill or chronic minor spillage could affect the beaches, water areas and historic sites making them at least temporarily unuseable for recreational purposes. If such pollution incidents occurred during periods of normal heavy visitor use, loss of recreational enjoyment and use and the loss in economic benefit to the vicinity could be substantial.

Water sports, such as swimming, diving, spearfishing, underwater photography, fishing for finfish and shellfish, boating and water-skiing would be most directly affected by an oil spill. Other marine-related activities such as beachcoming, shelling, painting, shoreline nature study, camping and sunbathing would be made much less attractive for an indeterminate period, depending upon the promptness and efficiency of the clean-up effort.

E. Structures in Relation to Shipping

The Port of New Orleans is one of the major commercial arteries in the United States, and shipping, both to and from the port, is increasing constantly. 1/ Safety fairways have been established to permit safe passage of vessel traffic into and out of the port. Anchorage areas are similarly designated for safety purposes.

While exploratory drilling in shipping lanes is permitted with approval by the Corps of Engineers, installation of fixed structures (as previously described in Section III. A.2 of this statement) is prohibited. Production can be initiated, however, by directional drilling from a portion of the tract outside the lane or from adjacent leaseholds outside of fairways. 2/ Despite the installation of navigational aids, the erection of additional platforms on the OCS, particularly those adjacent to fairways, poses a increased hazard to shipping.

1/ See Attachment E.

2/ A conventional operation of this type might involve drilling a well straight down to 2000ft. and then directionally drilling with the angle to the vertical gradually increasing to 35 degrees at total depth.

VI. Relationship Between Local Short-Term Use and Maintenance and Enhancement of Long-Term Productivity

The principle short-term use of the proposed sale area would be the extraction of oil and gas from those tracts which prove economically productive. However, since the total hydrocarbon reserves are finite, the extraction would also lower the long-term productivity of the oil and gas resources of the Gulf of Mexico. Another short-term use of minor importance is the concentration and harvest of fishing resources at structures.

Limited daily oil spillage will occur from the development of the proposed tracts. Accidents associated with oil and gas production could occur. The long-term effects of oil spills in the marine environment are not clearly understood. Although local effects of oil spills in this and other areas have been summarized in several reports, the studies have varied in procedure, the extent and composition of the products spilled had differed, and a variety of natural and physical conditions have been present. The long-term effects of incremental and major spillage of oil on the environment cannot be projected until reliable data become available which will permit an analysis of the net result of the combined effects. This will be a major concern of the Bureau of Land Management's oil pollution study team described in section III. A.4 of this statement. The additional stress which the ecosystem can absorb is limited, but at present, the bounds of these limitation are not known. St. Amant observes, "Certainly the significance of the continual addition to and accumulative effects of sublethal

pollutants in the environment is probably the most important ecological question facing us today". 1/

A primary concern is the effect of the breakdown of oil in the marine environment. Among the fractions from the petroleum breakdown are aromatic compounds some of which (toluene and benezene) are very toxic on contact. Other aromatic compounds, including those with carcinogenic properties, are dangerous if ingested, and there is concern that they might be concentrated and transferred through the marine food chain to man. 2/ The regulations under which further development would occur are the most stringent ever promulgated. With strict enforcement of these regulations and their further improvement, the possibility of adverse effects from the proposed action would be minimized.

1/ St. Amant, Lyle S., "Biological Effects of Petroleum Exploration and Production in Coastal Louisiana", Louisiana Wildlife and Fisheries Commission, December 1970, p. 20.

2/ M. Blumer, "Oil Pollution of the Sea", op. cit., pp. 6-12.

VII. Irreversible or Irretrievable Commitment of Resources

With further development of oil bearing OCS lands offshore Louisiana, the major irreversible or irretrievable commitment of resources would be the mineral production itself. It has been estimated that none or possibly one new pipeline could result from this sale. If an onshore pipeline does result, then some irretrievable loss of marsh or estuary also would be incurred. Such losses and their impact can and will be minimized through proper planning and by using the most appropriate construction techniques. This will be assured through the cooperative efforts of this Department and the U.S. Army, Corps of Engineers (who must approve all construction in navigable waters) and other responsible Federal and State agencies.

The major significance of oil spillage in the marine environment is its potential effect on living things. "Marine life is interconnected in a web of interrelated food chains all of which depends in the end on the chemical situation in the marine environment. Diversity of species is an essential characteristic of these food webs, for diversity is associated with stability in ecological systems." 1/ At this time, there is no evidence that low level spillage has led to an irreversible commitment of resources, nor is there any conclusive evidence that it has not.

1/ Schachter, O. and Serwer, D., "Marine Pollution Problems and Remedies", The American Journal of International Law, Vol. 65, 1971, pp. 84-111.

VIII. Alternatives to the Proposed Action

A. Hold the Sale in Modified Form

The proposed sale could be held by offering only those tracts determined to have a low potential for environmental risks. Those tracts believed to have high environmental risks could be deleted from the sale and considered for offering at a later date, should improved technology or other circumstances warrant. The analysis of the tracts included in this proposed sale indicates that none pose environmental risk so high as to be classified as "unacceptable". This alternative could also allow for special stipulations (including and in addition to those presented in Sec. III. D) on any proposed tract where additional requirements might be necessary to protect the environment or to minimize or eliminate possible conflicts with, or potential damage to, other resource values or commercial uses of the Gulf of Mexico and the adjacent land areas.

Another possible modification of the proposed sale would be to offer only those tracts estimated to be gas producing. Although this would reduce the potential hazard of oil pollution, it would not eliminate it because the gas tracts in this proposed sale are expected to be "wet" gas producers. This modification would eliminate 65 out of the 78 tracts proposed for offering and thus, would significantly reduce the part this proposed sale could play in meeting the Nation's energy needs.

B. Withdraw the Sale

In addition to modification of the proposed sale, all tracts could be withdrawn from consideration from leasing. A decision to withdraw the sale completely or to seriously limit the number of tracts to be leased would diminish the contribution of OCS petroleum toward meeting future energy demand, and would subsequently necessitate development of alternative sources of energy.

The oil and gas from tracts projected for leasing at this sale would represent a significant contribution toward meeting domestic energy needs. The sale is expected to supply relatively short-run energy requirements (i.e. 5 to 15 years). Few alternatives exist to help offset the need for domestic oil and gas during this period. The alternatives discussed below are those which may help meet projected energy demands in the event the proposed sale is withdrawn.

The following represents a list of energy sources or actions which if implemented might be considered as alternatives to offshore oil and gas in supply short-run energy needs:

1. Increased oil imports
2. Increased onshore oil and gas production
3. Increased nuclear power
4. Increased use of coal
5. Increased hydroelectric power
6. Modification of FPC natural gas pricing
7. Modification of market-demand prorationing systems
8. Oil shale production
9. Stimulation of Recovery from known deposits
10. LNG imports
11. Synthetic natural gas

In addition to consideration of these alternatives as presented below this discussion will consider the possibility of reducing energy demand as a

method which might decrease or eliminate some of the energy requirements to be satisfied by this sale. A table has also been prepared showing the incremental production potential of the alternatives considered and the possibility of having a combination of sources substitute for the proposed sale.

There are additional potential energy sources which hold great promise for the future. They are not, however, sources which are considered to be reasonably available to meet short-run energy demand, since their utilization will depend on future technologic development, economics, and adequate environmental safeguards.

The development of energy sources such as desulphurization of coal, tar sands, geothermal resources and solar energy are in this category, but the impact of these sources on the energy supply will not be significant until after 1980. These energy sources are considered to be supplements rather than true alternatives to offshore oil and gas development in the short-run. Therefore, energy sources in this category will not receive examination, at this time, as possible alternatives to this proposed OCS oil and gas lease sale. 1/

1/ These alternatives have received detailed consideration by the Department as part of the Environmental Impact Statement and the administrative review for the Trans-Alaska Pipeline, and are available for examination by all interested parties.

1. Increased Imports of Oil, Natural Gas and Petroleum Products

Prior to the final preparation of this section, the working group of the Oil Policy Committee was consulted and suggestions were made on how to improve the analysis. These comments have been incorporated where feasible.

Based upon the Department of the Interior's Economic and Security Aspects of the Trans-Alaska Pipeline Analysis, estimated 1980 oil demand will most likely be 22 million barrels per day. The comparison of projected domestic production deficits relative to that projected demand under the various assumptions considered, ranges from 8 million barrels per day (41% of demand) to as high as 16.2 million barrels per day (65% of demand). Such deficits must be provided for either by (1) reduction in demand as discussed later in this statement, (2) increased oil imports, or (3) development of additional sources of domestic supply, or a combination of 1, 2, and 3. This section discusses the alternative of increased oil imports.

The alternative of increased oil imports can be accomplished by employing one of several approaches. First, oil imports can be increased within almost any quantity and manner within the context of the Mandatory Oil Import Program. This program, in terms of volume and economic and security effects, is more complex than the proposed OCS lease sale; and the alternative of increased oil imports can be met within the context of the existing program. Second, all oil import controls would be removed which would allow possibly lower cost foreign imports to enter the United States to whatever extent market systems accommodate the use of such oil

in lieu of domestic production. Third, all existing oil import controls could be removed and a tariff system utilized to limit oil imports. The effectiveness of any of these approaches would, of course, depend on the continued availability of foreign oil supplies.

A major issue relative to this consideration is the extent to which foreign import controls must be maintained to assure domestic production capabilities required to meet national security needs. The West Coast is under a quota system which allows overseas imports up to the amount required to meet area demands in excess of domestic production and overland imports. In the absence of oil from the proposed OCS sale, it is assumed that imports would continue to be allowed to come into the West coast on this same basis. Further, based on current distribution patterns, only 0.9% of the OCS oil would be shipped to District V. The question of increased imports therefore is primarily one of impact on other areas in the United States.

There are certain environmental advantages associated with the transporting of oil in United States vessels over which adequate environmental control can be maintained, versus foreign vessels subject only to distination controls. By contrast, there can be greater environmental hazards associated with tanker transportation that parallels coastal areas versus routes that cross the open oceans. There also can be significant environmental considerations associated with the additional facilities required to handle larger ships and increased import volumes in the eastern and Gulf Coast regions.

Assuming that there would be no substantive change in U. S. energy policy, analysis indicates that additional import facilities soon will be needed in the eastern and Gulf regions either with or without the OCS oil.

The context in which imports are considered within this alternative relate primarily to the import of approximately 0.1 to 0.2 million barrels of oil per day in lieu of a like amount of oil and gas to be produced from the OCS sale.

If the oil import controls were eliminated, water-borne imports might increase by as much as 7 million barrels per day and the related impacts could be significantly different from the nature and magnitude of those directly related to an oil for oil and oil for gas substitution for this single OCS sale.

a. Mandatory Oil Import Program

The Mandatory Oil Import Program was established by Presidential Proclamation No. 3279 on March 10, 1959, to "preserve to the greatest extent possible a vigorous, healthy petroleum industry in the United States." It is a national security program designed to accomplish the objectives of Section 232 of the Trade Expansion Act of 1962, as amended, and its predecessor acts.

The most authoritative definitions of these national security objectives are to be found in the legislation and Proclamation 3279, as amended. The most recent official presentation of the objectives is contained in

the Office of Emergency Preparedness Report on Crude Oil and Gasoline Price Increases of November 1970, April 1971. This document establishes the following objectives:

1. A satisfactory level of domestic reserves of crude oil, supplemented from secure foreign sources of supply;
2. Maintaining spare capacity to produce and deliver crude oil when international factors disrupt supplies from other sources;
3. Maintain refinery capacity in the United States adequate to meet both defense and essential civilian needs, in periods of disruption in normal patterns of world oil movement; and
4. Provide a healthy petroleum industry in the United States with a capacity to meet the nation's security requirements.

In the report of the Cabinet Task Force on Oil Import Control, February, 1970, it was noted that objective standards to be used for appraising the threat to national security are not stated with precision.

Of necessity, the magnitudes of essential needs mentioned above and the reliability of foreign sources of oil are continuously evaluated by the responsible government officials. In addition to the quantitative and qualitative evaluation of oil supply and demand, there are three basic functions performed under the Mandatory Oil Import Program: The degree of import restriction is regulated through the establishment and periodic revision of a variety of quota levels; permitted imports are

allocated among eligible domestic claimants; and implementing programs are administered on a day-to-day basis.

Policy direction, coordination, and surveillance of oil imports are responsibilities of the Director, Office of Emergency Preparedness, with the advice of the President's Oil Policy Committee which he chairs. Program administration is a responsibility of the Secretary of the Interior.

Changes in the Mandatory Oil Import Program are accomplished by Presidential Proclamations and implementing Oil Import Regulations promulgated by the Secretary of the Interior with the concurrence of the Director, Office of Emergency Preparedness.

Quotas for the importation of petroleum are published annually for Petroleum Administration Districts I-IV (States East of the Rocky Mountains), District V (West Coast States, plus Alaska and Hawaii), and Puerto Rico. For purposes of import controls, petroleum imports are categorized as crude, unfinished oils, finished products, No. 2 fuel oil, and residual fuel oil.

Except for the importation of unrestricted licensed quantities of residual fuel from overseas sources into District I (the East Coast States plus Vermont and West Virginia), of 45,000 barrels per day of No. 2 oil from Western Hemisphere sources into District I of asphalt into District I-IV and of residual fuel imported overland

from Canada into Districts II-IV, product imports are almost negligible, and have been intentionally discouraged to minimize the "exportation" of refining capacity.

Special arrangements are made for imports into Puerto Rico, and for shipments of relatively small quantities of products from Puerto Rico (64,000 barrels per day) and the Virgin Islands (15,000 barrels per day) to the mainland.

Virtually all imported unfinished oils (15% of the license in Districts I-IV and 25% in District V), as well as crude imports are further processed upon entry into the U.S. These oils are imported primarily by refiners, although some licenses are granted to petrochemical producers. Allocations to refiners are made according to a sliding scale based on refinery inputs. Petrochemical allocations are computed as a percentage of inputs. (11.2% in Districts I-IV and 11.9% in District V).

The quota for imports into District V is computed as the amount required to supplement estimated domestic crude production and quota-free overland imports from Canada so as to meet estimated demand in the District. The quota for imports into Districts I-IV other than residual fuel and certain products which enter without restriction (Canadian NGL, Western Hemisphere LPG), was calculated as a percentage of estimated domestic consumption during the early years of the Mandatory Oil Import Program. At the present time, the quota is computed as 12.2% of estimated domestic

production in Districts I-IV, plus annual increments of the magnitude recommended by the minority Report of the Cabinet Task Force on Oil Import Control. Although the modified 12.2% formula remains the official basis for computing the quota, the annual increment is now based on a comparison of projected supply and demand. On May 11, 1972, the President issued a proclamation raising oil import quotas in Districts I-IV by 230,000 barrels a day. The Canadian quota was raised 30,000 barrels per day while the "offshore" quota was raised by 200,000 barrels. This represents an overall increase of about 15%. It can reasonably be assumed that the quota for Districts I-IV will be allowed to expand further as increases in demand continue to outstrip domestic production capacity.

On the average, imported petroleum has been less expensive than domestically produced petroleum, therefore, increased imports have some effect upon petroleum prices. It generally is agreed that, were the oil import quotas to be substantially increased or the quota system abolished in its entirety, imports presumably would increase, the domestic price of oil over the short term would fall (perhaps to the price of imported oil if controls were abandoned entirely), consumption would rise somewhat in response to lower price, and marginal domestic production (primarily onshore) would be forced out of production. It also is possible that domestic exploration and development incentives would be reduced resulting in a decline in the

development of new domestic oil and gas resources. (The fall in prices assumes that foreign countries would not continue to further restrict production in order to meet their own objectives.)

If additional imports were allowed under the quota and allocation systems as they now exist, there would probably be no substantial change from current trends with respect to the mix of imports between crude, unfinished oils and products.

The Mandatory Oil Import Program has been, and continues to be, a subject involving wide differences of opinion, much of which centers around a difference of perception of the relative importance of security of supply and consumer prices. From a technical standpoint, there also is disagreement of how the increase of imports within the program or the elimination of oil import restrictions would affect domestic oil supply, on the level of imports from insecure sources which would be "acceptable", and on the level of emergency production capability that could be maintained under alternative import assumptions.

In considering the modification or elimination of the Mandatory Oil Import Program as an alternative to the production of oil and gas from the proposed OCS sale, a particular concern is the security of Middle East supply sources which have been characterized by instability and international tension. The supplies of oil from that area may be subject to interruption for political or economic reasons with little or no advance warning. In their comments relative to the Department of the Interior's analysis of the Economic and Security Aspects of the Trans-Alaska Pipeline, the Secretaries of State and Defense and

the Director of the Office of Emergency Preparedness indicated their concern that "failure to obtain desired additional oil supplies (from the North Slope) will necessitate increasing imports from insecure sources to such high levels that a long-term foreign supply disruption could slow down industry and imperil our national security". As noted in Chapter V of the Interior analysis, failure to bring the 2 million barrels/day of North Slope oil to market would raise dependence on Eastern Hemisphere oil from a range of 22 to 34 percent to a range of 31 to 39 percent of domestic demand in 1980 and from a range of 33 to 41 percent to a range of 40 to 49 percent in 1985. While the potential volume from this proposed sale is only about 10 percent the North Slope volume, it involves the same types of consideration but of different impact scales.

A systematic treatment of the oil import subject is contained in the report of the Cabinet Task Force on Oil Import Control, (The Oil Import Question, 1970). The majority of the task force expressed a preference for tariffs over the present system as the basic method of restricting imports. There was, however, concurrence that no more than 10 percent of U.S. requirements should be met by imports from the Eastern Hemisphere. Such a limitation would require some type of continuing import controls. In a "separate report" section, a minority argued that the Mandatory Oil Import Program has in fact worked effectively and that the proposed tariff would be undesirable for a variety of reasons. 1/

1/ A subcommittee of the House Committee on Interior and Insular Affairs held extensive hearings on the Task Force report. See U.S., Congress, House, Committee on Interior and Insular Affairs, Oil Import Controls, Hearings, before the subcommittee on Mines and Mining, March and April, 1970.

The Oil Import Question identified eight major difficulties that might attend dependence on foreign supplies:

(1) War might possibly increase our petroleum requirements beyond the ability or willingness of foreign sources to supply us.

(2) In a prolonged conventional war, the enemy might sink the tankers needed to import oil or to carry it to market from domestic production sources such as Alaska.

(3) Local or regional revolution, hostilities, or guerilla activities might physically interrupt foreign production or transportation.

(4) Exporting countries might be taken over by radical governments unwilling to do business with us or our allies.

(5) Communist countries might induce exporting countries to deny their oil to the West.

(6) A group of exporting countries might act in concert to deny their oil to us, as occured briefly in the wake of the 1967 Arab-Israeli War.

(7) Exporting countries might take over the assets of American or European companies.

(8) Exporting countries might form an effective cartel raising oil prices substantially.

A subsequent study made by the Petroleum Industry Research Foundation reexamined the principal assumptions and conclusions of the Task Force regarding U.S. dependency on oil imports in 1980 under various price assumptions, (Oil Imports and the National Interest, 1971). This study raised questions relative to an indicated overstatement of both U.S. production and Western Hemisphere imports and an understatement of demand for imports from the Eastern Hemisphere which in turn raised further questions as to the extent to which the United States should depend on Middle Eastern and North American petroleum sources.

A Joint Economic Committee Background Study relative to the April 15, 1971, OEP Report on price increases in crude oil and gasoline raised numerous questions relative to the need for, and effectiveness of, the Mandatory Oil Import Program. 1/

Thus, the security problem has two principal parts: a question of military security, and a question of economic security. Both advocates and critics of the Oil Import Program have tended to focus principally on the economic security issue.

As primarily indicated the crux of the argument against importing a substantial fraction of the nation's oil (and hence, for developing the resources of the proposed OCS sale) is that the source of additional foreign oil--in general, the Middle East is "insecure",

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1/ U.S., Congress, Joint Economic Committee, Report on Crude Oil and Gasoline Price Increases of November 1970, a Background Study, November 3, 1971.

and might be tempted to withold oil exports to the United States for political and/or economic gain (generally in an environment short of war, though local conflicts in volatile areas are not inconceivable).

A study by Drs. Schurr and Homan for Resources for the Future 1/ notes that the question of supply interruptions--

> "needs to be dealt with in the interests of both the importing and exporting countries because supply interruptions are economically damaging to both. Not only do they have sharp short-run effects which are economically painful, but their longer-run consequences can also be damaging if channels of commerce are diverted into alternatives which impose a permanent economic penalty upon both those countries that sell oil and those that buy."

However, this interdependence does not guarantee that interruptions will not occur. The study points to interruptions from the shutdown of Iranian production beginning in 1951, the closure of the Suez Canal and attendant lengthening of transportation routes in 1956-1957 and again from 1967 to the present, and quotes Walter Levy, a leading international oil authority and consultant, as saying:

> "Nor can the West rely on the importance of uninterrupted oil operations and oil revenues to Middle East governments as a deterrent to hostile actions. Economic considerations, important as they are to the relatively impoverished countries of the area, become insignificant when confronted with political necessities or political pretentions."

1/ Sam H. Shurr and Paul T. Homan, et. al., Middle Eastern Oil and the Western World: Prospects and Problems. New York: American Elsevier, 1971.

Eleven major oil producing countries have joined the Organization of Petroleum Exporting Countries (OPEC), in an attempt to obtain greater bargaining power in their dealings with the international oil companies.

A 5-year agreement reached in 1971 with the Persian Gulf countries provides for substantial increases in the payments to the host governments. The other members followed suit with equal or larger increases. In the second year of the agreement, the OPEC countries have been given further increases to compensate for the de-valuation of the dollar, and are demanding participation as part owners in the oil companies exploiting their resources. If OPEC can maintain cohesiveness in the face of diverse national demands and historical relationships, continuing pressure for economic and political concessions by the oil-importing countries may be anticipated. The Oil Import Program is an attempt to mitigate any such pressures.

Based upon the assumption that at least minimum national security controls will be maintained, little of the additional oil required to be imported to offset oil and gas from the proposed OCS sale could be provided from Canada or other "secure" sources.

If the oil import program were abandoned, some of the Canadian supply might no longer be exported to the United States because of the lower price of imported supplies.

Calculations of foreign source contributions for 1980 generally assume that preference will be exhibited in this order, i.e., that Canada will provide as much as she is able, then the other Western Hemisphere countries

will provide as much as they are able, and the difference between gross demand and total domestic and Western Hemisphere supply would be made up by imports from the Eastern Hemisphere (at a possible cost in security and balance of payments).

Projections of potential contributions from Canada and other Western Hemisphere nations are shown in the following table. Additional imports from Canada will require substantial additional discoveries and further development of the tar sands industry in that country. However, these do not appear to be price competitive at present. Canada is expected to continue to be a net importer of petroleum (Schurr & Homan, 1971). Canada exports about half its production, which is located primarily in the west to the United States, but imports slightly more than the amount to the Canadian East Coast. Canada's ability and willingness to maintain and increase its exports depends on its ability to satisfy domestic demands, to increase production, and to find sufficiently stable and attractive markets.

Projections of Imports from Canada and
Other Western Hemisphere Sources
(million barrels per day)

port Source	Data Source	1965	1970	1975	1980	1985
nada	Schurr 1/	0.41	--	0.78	0.95	--
	N.P.C. 2/	--	--	--	--	1.90
	Draft E.I.S. 3/	--	0.70	1.10	1.60	2.20
	Bu. Mines 7/	--	0.76	--	--	1.64
	Syncrude 8/	--	--	--	1.63	--
her West. Hem.	Schurr	1.66	--	2.46	2.82	--
	N.P.C.	--	--	--	--	1.80 4/
	Draft E.I.S.	--	2.20	2.90	3.25	3.50
tal West. Hem.	Schurr	2.07	--	3.24	3.77	--
	N.P.C.	--	--	--	--	3.70
	Draft E.I.S.	--	2.90	4.00	4.85	5.70
nimum Estimate	Canada	--	--	--	0.95	1.64
	Other W.H.	--	--	--	2.00 5/	1.80
	Total 6/	--	--	--	2.95	3.44
ximum Estimate	Canada	--	--	--	1.63	2.20
	Other W.H.	--	--	--	3.25	3.50
	Total	--	--	--	4.85	5.70

Schurr, Sam H., Paul T. Homan, et. al., Middle Eastern Oil and the Western World: Prospects and Problems, New York, American Elsevier, 1971, p. 28. Schurr gives imports in four categories; Middle East, North Africa, Caribbean, and "Other"; the assumption that "other" represents Canada appears consistent with other projections.

National Petroleum Council, "U.S. Energy Outlook: An Initial Appraisal, 1971-1985," Vol. 1, July 15, 1971, pp. 26, 28.

Draft Environmental Impact Statement for the Trans Alaska Pipeline, prepared by Department of the Interior, January 1971, p. 185.

Assuming all Latin American excess capacity reaches the United States: see National Petroleum Council, p. 28.

Assumed for present purposes, based on the NPC argument that total for 1985 would be 1.80 million bbl/day

Obtained by adding minimum (maximum) values for Canada and other Western Hemisphere.

Appendix L, part 3, vol. II of USDI, "An Analysis of the Economic and Security..."

Syncrude Submission, exhibit 2, to Proceedings concerning Application No. 5899 to Albert Energy Resources Conservation Board, 21 September 1971.

The contribution of other Western Hemisphere nations will be determined by their attitude toward their oil industries (which, though largely own by the international oil companies, are subject to local government regu tion and, occasionally, expropriation), by patterns of domestic demand, financial status, and development preferences, so that the projections o export potential to the U. S. are conjectural.

Although the projections show substantial increases in imports from South America and the Caribbean ("Other Western Hemisphere"), other sour cite declining reserve-to-production ratios in Venezuela and the 6.4 per annual growth in Latin American demand as evidence that demand in South America will more than absorb any increases in production. 1/ Recent discoveries in Ecuador, though still in the preliminary stage, may yield at least one million barrels per day by the late 1970's. 2/

Based upon the assumption that existing preferences will be continued, these projections may be compared with the overall crude oil deficit projections to obtain a balance that probably would be provided by the Eastern Hemisphere. 3/ This is reflected in the following table. However, it must be recognized that if all controls on imports were abandoned, the deficit would be much higher than is reflected in these calculations.

1/ Alberta Energy Resources Conservation Board, Proceedings Concerning Application No. 5849, September, 1971.

2/ Oil and Gas Journal, February 8, 1971, pp. 24-26.

3/ USDI, "An Analysis of the Economic and Security Aspects of the Trans Alaska Pipeline," Vols. I and II, and Supplement, 1971.

RANGE OF PROJECTED DEPENDENCE ON EASTERN HEMISPHERE
1980 and 1985
(million barrels per day) (percent of demand)

Year	Contribution of Western Hemisphere	Domestic Deficit Estimate		
		Low (8.1)	Median (11.6)	High (16.2)
1980	Low (2.95)	5.15 (26%)	8.65 (39%)	13.25 (53%)
	High (4.85)	3.25 (16%)	6.75 (31%)	11.35 (45%)

		Domestic Deficit Estimate		
		Low (11.1)	Median (16.6)	High (22.2)
1985	Low (3.44)	7.66 (33%)	13.16 (49%)	18.76 (61%)
	High (5.70)	5.40 (23%)	10.90 (40%)	16.50 (53%)

It has been argued that the national security objectives of the oil import program could be met in other ways. Generally, these alternatives are means of coping with an interruption of supplies: Consuming countries can draw down oil stocks (which depend on storage capacity), expand production from remaining sources (with varying incremental volume, cost, and time lag), or reduce demand by rationing (of varying formality and intensity). The potential of the first two could be increased by pre-crisis planning and investment. It should be emphasized that such measures are alternatives to the oil import program, not to production from the proposed OCS sale.

The various "security alternatives," such as storage, would generally involve capital investment, import of the oil for the security inventory (in certain cases) and import of oil to replace the foregone domestic production. The national security and economic aspects of such alternatives are discussed in detail in several studies. 1/

As previously indicated in the introduction to this section, oil imports could be increased within the structure of the oil import quota system or the system could be abandoned. In the former case, the additional imports could be set at levels to specifically replace a comparable amount of OCS production.

1/ USDI, Trans-Alaska Pipeline System, Environmental Impact Statement; The Oil Import Question, op. cit., and, U.S. Congress, House, Oil Import Controls, 1970. op. cit.

b. Relationship of Oil from the Proposed OCS Sale to Foreign Imports

In this analysis, Mid East oil is considered to be an alternative to the oil and gas which could be produced by the proposed OCS lease sale. Imported oil from other sources (except Canada) would be similar in environmental impact to the impacts from importation of Mid East oil. We have not included Canadian oil, which could be imported by pipeline, as an alternative because we assume that Canadian oil will be imported to the extent of Canadian reserve capacity, with or without the proposed sale. It is assumed that incremental supplies will be available from the the Mid East.

Table 1, "Daily Distribution of Oil from East Louisiana OCS Sale and Distribution of Alternative Foreign Imports," presents the distribution and consumption patterns of oil from the proposed sale when the proposed leases are in full production (estimated 6 years after leasing). The table also shows the import and distribution patterns of an equivalent amount of Mid East oil.

The expected range of production for the proposed sale is 75,000 to 150,000 barrels per day. Based on current distribution patterns, this oil would be consumed as follows: PAD 1/ I - 43.8%; PAD II - 25.5%; PAD III - 29.5%; PAD IV - 0.3%; and PAD V - 0.9%. Oil from the proposed sale would be distributed to PAD I by pipeline (42.2%), Tanker (55.9%) and Barge (1.9%). Oil would be distributed to PAD II by pipeline (87.4%) and Tanker (12.6%). Oil to PAD III and IV would be entirely by pipeline.

1/ Petroleum for Administration of Defense District.

Sale and Distribution of Alternative Foreign Imports

Table I

	Dist. I		Dist. II		Dist. III		Dist. IV		Dist. V	
	Hi 1/	Lo 2/	Hi 1/	Lo 2/	Hi 1/	Lo 2/	Hi	Lo	Hi	Lo
Proposed OCS Sale:										
Oil Consumed (bbls/day	65,700	32,850	38,250	19,125	44,250	22,125	450	225	1350	675
% of Sale Prod.	43.8	43.8	25.5	25.5	29.5	29.5	.3	.3	.9	.9
Interdistrict Shipments										
Pipeline %	42.2		87		100		100		87.4	
(Ship) Tanker %	55.9								12.6	
Barge%	1.9		13							
Alternative :										
I. Foreign Import										
(Total imported (BBLS)	148,650	74,325							1350	675
Oil consumed (bbls/day	65,700	32,850	38,250	19,125	44,250	22,125	450	225	1350	675
Source	Mid-East	Mid-East	Dist. III	Dist.III	Dist.III	Dist.III	Dist.III	Dist.III	Mid-E.	Mid-E.
Import Method:										
Pipeline %			87	87	100	100	100	100		
Tanker %	100	100							100	100
Barge%			13	13						

1/ Estimated OCS production of 150,000 bbls. per day after the 6th year of leasing.

2/ Estimated OCS production of 75,000 bbls. per day after the 6th year of leasing.

We assume that most of the imported oil to replace the oil from the OCS sale would be imported in PAD I (74,325 - 148,650 barrels) since PAD I has the largest consumption under existing patterns and because oil imported into PAD I can free PAD II production for use in PAD III and for transfer to districts II and IV. A small amount of oil (675 - 1,350 barrels) would be imported in PAD V to exactly replace oil from the proposed sale which would be consumed in that district under existing distribution patterns. Under this assumption, the entire amount of imported oil would be used in the districts where they are imported thus freeing oil from PAD III to meet consumption requirements in that district and in PAD II and IV. This oil would be imported into PAD I and V by tanker and into the other districts in a manner similar to that for oil from the proposed OCS sale. Consumption in all districts under this alternative is the same as for oil produced by the proposed OCS sale.

Table 2, "Daily Distribution of Gas from East Louisiana Sale and Distribution of Alternative Foreign Imports by Consuming Regions", presents the distribution of consumption patterns of gas from the proposed sale when the proposed leases are in full production (estimated 6 years after leasing) by the consuming regions of the Future Requirements Committee as reported for 1970. The Table also shows the import and distribution patterns of Mid East oil which would produce an equivalent amount of energy to the gas from the proposed sale. We assume, in this analysis, that oil must substitute for gas because gas is not now available in conventional form from foreign sources. The importation of LNG will be discussed in the following section.

Distribution of Alternative Foreign Imports
By Consuming Regions

Table 2

	New Eng.		Appalachian		Southeast		Great Lakes		Mid. Conti.		Gulf Coast	
	Hi	Lo.	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo
Proposed OCS Sale												
Gas consumed (mmcf per day)	7.6	3.8	136.8	68.4	67.2	33.6	66.8	33.4	7.6	3.8	114.0	57.0
% of sale pro. 1/	1.9	1.9	34.2	34.2	16.8	16.8	16.7	16.7	1.9	1.9	28.5	28.5
Oil equivalent in terms of btu's (m bbls per day) 2/	1.4	.6	24.3	12.2	11.9	6.0	11.9	5.9	1.4	.6	20.3	10.2
Inter-District Shipments												
Pipeline %	100	100	100	100	100	100	100	100	100	100	100	100
Foreign Imports												
Total Imports (m bbls)			71.2	35.6								
Oil consumed (m bbls)	1.4	.6	24.3	12.2	11.9	6.0	11.9	5.9	1.4	.6	20.3	10.2
Import Method												
Pipeline %	100	100			100	100	100	100	100	100	100	100
Tanker %			100	100								
Barge %												
Source:	Appalachian		Mid East		Gulf Coast		Gulf Coast		Gulf Coast		Gulf Coast	

* Consuming Regions of the Future Requirements Committee as reported for 1970

1/ Based on distribution of South Lousiana gas to the consuming regions of the Future Requirements Committee as reported for 1970, each of the regions include the following states: New England, Maine, Vermont, Massachusetts, New Hampshire, Connecticut, Rhode Island; Appalachian: New York, Ohio, Pennsylvania, New Jersey, Delaware, Maryland, Kentucky, West Virginia, District of Columbia, Virginia; Southeast: Tennessee, North Carolina, South Carolina, Georgia, Alabama, Florida; Great Lakes: Michigan, Wisconsin, Illinois, Indiana; Mid Continent: Kansas, Missouri, Oklahoma; and Gulf Coast: Texas, Arkansas, Mississippi and Louisiana.

2/ Conversion factors fof 5.8×10^6 BTU's per barrel of oil and 1,032 BTU's per cubic foot of gas were used to arrive at 35,587 to 71,174 barrels of oil as an amount of energy equivalent to 200,000 to 400,000 tcf of gas.

While we assume direct substitutability of oil for gas, we realize that the necessary plant conversion to accomplish this substitution may not be possible in the short-run.

Current natural gas imports from Canada are about 800 billion cf annually Although the possibility exists that imports from Canada might increase, : is a matter of conjecture whether and when this source of supply could provide a feasible alternative to the supply of gas from the proposed sale Canadian policy has been to export only that gas which is determined to be in excess of Canadian domestic requirements projected over a 25 year perio In Nov. 1971, the Canadian National Energy Board dismissed applications to export a total of 2.6 trillion cf of gas to the U.S. based on its conclusi that no exportable surplus existed at that time.

The expected range of production for the proposed sale is 200,000 to 400,(0 million cu. ft. of gas per day. The equivalent amounts of oil to replace this gas would be 35,587 to 71,174 barrels based on conversion factors of 5.8×10^6 BTU's per barrels of oil and 1,032 BTU's per cubic feet of gas. The gas from the proposed OCS sale based on current distribution patterns would be consumed as follows: New England - 1.9%; Appalachian - 34.2%; Southeast - 16.8%; Great Lakes - 16.7%; Mid Continent - 1.9%; and Gulf Coast - 28.5%. Gas would be distributed to all regions by pipeline.

We assume that the entire amount of imported oil to replace the gas production from the proposed sale would be imported by tankers to the Appalachian Region (New York). This oil would be consumed in the

Appalachian Region or be transported to New England to meet the equivalent energy consumption of the gas from the proposed sale. In addition, the imported oil would replace gas transferred to Appalachia from the Gulf Coast allowing Gulf Coast gas to flow to the other regions. Distribution to all regions, except Appalachia, would be by pipeline.

In summary, this alternative involves the import of 109,912 to 219,824 barrels of oil per day to the East Coast (PAD I), primarily to New York, and 675 to 1,350 barrels of oil per day to the West Coast, PAD V. Based on the capacity of a 120,000 DWT tanker (921,200 barrels of oil), 1/ oil and gas from the proposed OCS sale would require one medium size tanker about every 4 - 8 days to the East Coast and about every 2 - 4 years to the West Coast.

c. Potential Environmental Impacts

The consideration of environmental impacts in this analysis primarily relates to additional ship traffic and oil handling associated with vessels and related handling facilities required for increased oil imports.

Environmental Impacts of Increased Imports

Since approximately 18,000 to 37,000 barrels of oil per day would be transported to PAD I by tanker from the proposed OCS sale (Table 1), the net volume of additional oil which would result from increased imports in lieu of the production from the proposed sale would be 91,912-182,824 barrels per day.

1/ Alyeska Pipeline Service C., "Marine Transportation System Description, Valdez to West Coast Port", June 22, 1971, Table 3.

Other detrimental environmental effects of increased oil imports are related to the substitution of oil for gas. Since natural gas combustion emits a lower level of particulate and sulphur dioxide pollution, the replacement of the 200-400 million cf/day would cause a deterioration in air quality.

(i) Increase in Ship Traffic

Because the tanker requirements to supply the alternative oil to PAD V, the West Coast, is extremely small, this analysis will concentrate on the tanker requirements for PAD I; however, oil pollution calculations will be made for PAD V.

This analysis estimates that one medium sized tanker (world standards) of 120,000 DWT size will be required every 4-8 days to deliver oil to PAD I (New York) to supply oil equivalent to the oil and gas that would be produced by the proposed OCS sale. It is assumed that the East Coast will have the facilities to accomodate this size tanker.

Daily ship traffic of ships over 100 gross tons has been estimated for New York at 97 in 1972 and 95 in 1980. An increase of approximately 670,000 barrels per day has been estimated to result in an additional 5 percent increase in ship traffic at New York. 1/ At this rate, increase daily ship traffic in the New York area as a result of importing the amount of oil included in this analysis would be approximately 0.6% to 1.2% (average).

1/ Data from "A Study of Maritime Mobile Satellites" Vol. I "Merchant Vessel Population/Distribution Present and Forecast" prepared by Automated Marine International, Newport Beach, California.

Because nearly 75% of all tanker arrivals in the U.S. occur between Virginia and Maine (most are in New York, New Jersey, and Connecticut), the East coast is particularly susceptible to tanker pollution. It is estimated that tanker ballasting, loading, unloading, and accidents release about 4 million tons of hydrocarbon pollutants annually into world oceans.1/ To the extent that it would make more tanker traffic unnecessary, the proposed lease sale presents environmental advantages over increased oil imports.

Three factors are considered in analyzing possible oil pollution as a result of increased imports: (a) intentional discharge, (b) accidental discharge and (c) casualty analysis.

(a) Intentional Discharge

The two primary sources of intentionally discharged oil are shoreside ballast treatment facilities and underway tank cleaning operations. 2/ Any development of ballast treatment facilities would be accomplished at the loading end of the system and is discussed in paragraph (iv) below. It may be assumed that all intentionally discharged oil in U.S. waters from this alternative will come from tank cleaning operations.

To assess fully the impact of tank cleaning operations, three separate analyses are necessary; one assuming uncontrolled operations, one assuming load-on-top (LOT) operations, and one assuming compliance with

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1/ Blumer, Max, "Oil Pollution of the Sea", Oil on the Sea, David P. Hoult (ed.), Plenum Press, New York, 1969.

2/ USDI, Trans-Alaska Pipeline System, Environmental Impact Statement op. cit.

IMCO standards proposed in the 1969 amendments to the International Convention for the Prevention of Pollution of the Sea by Oil, 1954.

At the rate of import of 91,912-182,824 barrels per day in the New York areas, the estimated rates if discharge would be 62-124 barrels per day from uncontrolled operations, 23-45 barrels per day from LOT tank cleaning operations or 6 to 10 barrels per day assuming compliance with the IMCO standards. 1/ Similar spillage for PAD V would be 0.3% to 0.6% of the PAD I rates.

(b) Accidental Discharges

The 1970 Pollution Incident Reporting Systems (PIRS) data indicate that approximately 0.00015% of the oil handled in the U.S. was spilled during transfer operations. 2/ Applying these figures to the indicated throughput of imported oil, the average volume and number of spills during transfer operations in the New York area would be approximately 0.1 to 0.3 barrels per day. For the West Coast, the rate would be approximately 0.002 barrels per day.

In the restricted waters surrounding harbors and ports the 1970 experience indicates that about 0.00009 percent of the oil handled is accidentally discharged. 3/ For the New York area, this would amount to 0.09 to 0.18 barrels per day spilled.

1/ U. S. Coast Guard, "Marine Transport Systems of the Trans-Alaska Pipe-Line System", 1972.

2/ Ibid.

3/ Ibid.

(c) Casualty Analysis

The worldwide tanker casualty analysis indicates that 0.0192% of the oil transported is spilled, exclusive to transfer operations. Applied to the 91,912 to 182,824 barrels per day throughput, this amounts to approximately 16 to 33 barrels per day discharged from casualties. 1/

However, it must be recognized that an average calculation such as this has little meaning from an environmental impact standpoint. Such impact could be nominal where small spills are involved or where the spill occurs in such a manner as to have little impact on coastal or restricted water areas. By contrast, a single catastrophic incident such as the breakup of the Torrey Canyon can have disastrous results. The oil spill problems is a subject involving considerable study effort. The first report of the President's Panel on Oil Spills 2/ presents considerable details relative to the subject.

(ii) Terminal Requirements

On the basis of the requirement of one additional tanker visit to the New York area (120,000 DWT size) every 4-8 days or an increase in ship traffic of 0.6% to 1.2% in 1980, we estimate that no additional terminal facilities would be required to handle the imports necessary to offset oil production from the proposed OCS sale.

1/ USDI, Trans-Alaska Pipeline System, op. cit.

2/ President's Panel on Oil Spills, The Oil Spill Problem, Executive Office of the President, Office of Science and Technology, First Report, 1969.

(iii) Off-Loading-Facilities

We assume that off-loading facilities presently in place would be used to service imports in this analysis. Oil would be moved from the terminal facilities to refineries by ways of existing pipelines. Environmental risk from these operations would be those attendant to normal pipeline operations, e.g., pipeline leaks and more importantly, breaks from construction, anchor dragging, etc. These risks can be minimized by clearly designating pipeline locations and by the use of automatic shut-down equipment that would detect any sudden drop in pressure on the line to first shut off pumping equipment and then automatically closing sectionalized valves to minimize the quantity of oil released.

(iv) Pollution Potential at Loading Site

This alternative would result in increased potential pollution at the loading end (foreign ports) where pollution control standards may not be as stringent as United States standards; therefore, this alternative would result in a potential net increase in pollution on a world-wide basis.

2. Increase Onshore Oil and Gas Production

a. Description of the Alternative

This alternative would require increased exploration, development and production of oil and gas from the Alaskan North Slope or from onshore sources in the lower 48 States. Increasing production in the lower 48 States has definite limitations when consideration is given to the current low exploratory and discovery rates, high production levels, continuing declines in reserves and the time required to explore for and develop hydrocarbon supplies. Trends in exploration and discovery cannot be easily and quickly reversed. Development of North Slope resources cannot occur prior to the establishment of an environmentally safe transportation system.

Domestic development of oil and gas resources occurred initially onshore but increasing supplies are beginning to come forth from the offshore areas. In 1970, 10.29% of the domestic U.S. oil supplies and 10.96% of the domestic U. S. gas supplies came from the Gulf of Mexico. These figures can be compared with the OCS contribution in 1960 of 1.93% of oil supplies and 2.14% of gas supplies. This increasing contribution to domestic production is particularly significant when looked at in terms of remaining resources onshore and the changing relationship between offshore and onshore potential.

Although proved reserves offshore total only 5 billion barrels of oil and 37.8 trillion cubic feet (tcf) of gas compared with 34 billion barrels onshore (including 9.6 on the North Slope of Alaska) and 252.9 tcf (including 26.0 on the North Slope of Alaska), the "indicated reserves plus undiscovered resources producible with current economics and technology" are more

nearly equal - 171 billion barrels and 840 tcf offshore and 246 billion barrels and 1.260 tcf onshore. 1/ Even with the exception of the Naval Petroleum Reserves (NPR) No. 1 and 4 and the North Slope of Alaska, potential onshore reserves could be adequate to meet projected demands but, drilling efforts have not resulted in discoveries that would offset increased production.

Proved crude oil reserves in onshore areas of the lower 48 States have declined by approximately 3 billion barrels within the period 1967-1970 even though recovery efficiencies have increased. During the period 1964-1970 a cumulative demand for natural gas totaled 126 tcf or 18 tcf a year, whereas reserve additions only equalled 17 tcf a year. The most serious decline occurred in 1968 and 1969 when demand totaled 39 tcf and reserve additions totaled 22 tcf. The ratio of reserves to production has fallen to about 8.8 for oil and 11.9 for gas.

Onshore geophysical work, leasing and drilling efforts have declined during the past decade. A number of factors, all adding up to insufficient economic attractiveness of onshore oil and gas ventures have been cited for the decline. Probably the most significant of all, is the increasing difficulty and cost experience by the industry in finding new oil and gas reservoirs sufficiently large to permit economic production. Only 30 wildcat wells were needed to find a significant field in the late 1940's; the number of wells required had nearly doubled by 1960 and this trend has not been reversed.

1/ USDI, United States Energy; A Summary Review, pp. 22 & 27.

The importance of finding large fields becomes apparent when it is noted that last year 63 percent of U.S. production was from only 264 of over 35,000 oil fields in the United States.

Drilling operations in the United States in 1970 were conducted in 34 States, and a total of 29,467 wells were drilled. The four leasing States in drilling activity (Texas, Oklahoma, Louisiana, and Kansas) accounted for 56 percent of the wells drilled.

Additional production could be obtained from onshore sources by a variety of methods as discussed in separate sections. Removal of prorationing restrictions and additional use of secondary recovery methods could result in additional production from existing or new wells. Subsidies or other economic incentives could add to onshore domestic production capacity, but there have been few studies of the cost or effectiveness of such a program. Alternatively, certain additional Federal oil resources onshore could be leased.

Of the onshore oil and gas sources in the Federal domain, those most attractive economically are on the North Slope of Alaska and in the Naval Petroleum Reserves (NPR) at Elk Hills California and in Alaska adjacent to the Prudhoe Bay area. The North Slope potential is by all standards significant, yet environmental problems associated with the transportation of these resources could decrease its desirability.

In addition to the question of availability of resources, it is important to view the probable distribution of the oil and gas from the proposed OCS sale. A transportation network is fairly well established from various producing regions to selected consuming areas. Based on 1970 distribution patterns, the anticipated production from the proposed OCS sale would be distributed in the following manner:

Consuming Area	Quantity Natural Gas (MCF Per Day)1/	1970 Distribution (%)
New England	3,800 - 7,600	1.9
Appalachia	68,400 - 136,800	34.2
Southeast	33,600 - 67,200	16.8
Great Lakes	33,400 - 66,800	16.7
Mid-Continent	3,800 - 7,600	1.9
Gulf Coast	57,000 - 114,000	28.5
Total	200,000 - 400,000	100.0

	Oil (Barrels Per Day)2/	
District I (Includes New England, Appalachia, and South Areas)	37,175 - 64,350	42.9
District II (Includes Great Lakes and Mid-Continent areas)	18,000 - 36,000	24.0
District III (Gulf Coast)	24,075 - 48,150	32.1
District IV (Includes Rocky Mountain area)	150 - 300	0.2
District V (Includes West Coast area)	600 - 1,200	0.8
Total	75,000 - 150,000	100.0

1/ Distribution of gas taken from reports by AGA on natural gas reserves.

2/ Distribution of oil taken from Figure L-4-2, Net Flows, in TAPS.

Chart 1

REGIONAL DISTRIBUTION OF NATURAL GAS PRODUCTION AND CONSUMPTION IN THE UNITED STATES MAINLAND IN 1970

Producing Area	New England	Appalachia	Southeast	Great Lakes	Northern Plains	Mid-Continent	Gulf Coast	Rocky Mountain	Pacific Southwest	Pacific Northwest	Total U. S.
Percentage Distribition of Net Production to Consuming Regions - 1970											
South Louisiana	1.9%	34.2%	16.8%	16.7%	--	1.9%	28.5%	--	--	--	100.0%
Texas Gulf Coast	1.2	13.9	5.1	12.1	--	0.7	67.0	--	--	--	100.0
Hugoton-Anadarko	--	3.4	--	25.9	15.4%	33.8	15.1	5.1%	1.3%	--	100.0
Permian Basin	--	--	--	6.4	12.6	1.6	31.9	--	47.5	--	100.0
Other Southwest	1.9	14.3	6.6	4.6	0.8	27.7	44.1	--	--	--	100.0
Rocky Mountain	--	--	--	--	9.5	--	--	38.7	46.0	5.8	100.0
California	--	--	--	--	--	--	--	--	100.0	--	100.0
Appalachia and other	--	91.3	--	8.7	--	--	0.1	--	--	--	100.0
Total	1.0%	18.1%	7.3%	13.1%	4.6%	9.0%	32.7%	2.5%	11.4%	0.3%	100.0%
Canada	2.2	1.3	--	19.5	2.6	--	--	5.5	39.1	29.8	100.0
Mexico	--	--	--	--	--	--	100.0	--	--	--	100.0
Total (Including Imports)	1.1%	17.5%	7.0%	13.4%	4.4%	8.6%	31.5%	2.8%	12.4%	1.3%	100.0%
Source of Natural Gas for Consuming Regions - 1970											
South Louisiana	57.0%	63.4%	77.9%	40.5%	--	7.0%	29.2%	--	--	--	32.4%
Texas Gulf Coast	19.3	13.7	12.6	15.6	--	1.5	36.8	--	--	--	17.3
Hugoton-Anadarko	--	2.8	--	28.2	50.9%	57.0	7.0	26.1%	1.6%	--	14.6
Permian Basin	--	--	--	5.8	34.7	2.3	12.3	--	46.6	--	12.2
Other Southwest	16.9	8.2	9.5	3.4	1.9	32.2	14.1	--	--	--	10.0
Rocky Mountain	--	--	--	--	10.5	--	--	67.1	18.2	21.6%	4.9
California	--	--	--	--	--	--	--	--	22.7	--	2.8
Appalachia and other	--	11.6	--	1.5	--	--	--	--	--	--	2.2
Total	93.2%	99.7%	100.0%	95.0%	98.0%	100.0%	99.4%	93.3%	89.1%	21.6%	96.4%
Canada	6.8	0.3	--	5.0	2.0	--	--	6.7	10.9	78.4	3.4
Mexico	--	--	--	--	--	--	0.6	--	--	--	0.2
Total (Including Imports)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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Source: Form 2 annual reports to the Federal Power Commission; Reports by American Gas Association Committee on Natural Gas Reserves.

Division of Fossil Fuels
Petroleum Branch
October 20, 1971

Chart 2

1970 Supply Distribution and Sources
(Thousand barrels per day)

	Production	Domestic Receipts: Crude and NGL	Domestic Receipts: Refined Products	Imports: Crude and NGL	Imports: Refined Products
District I	55	684	2,829	579	1,868
		(II) 21	(II) 56	S.A. 45%	Carr. & S.A. 87%
		(III) 652	(III) 2,769	E. Hem. 40%	E. Hem. 13%
		(IV) 10	(IV) --	Canada 15%	
		(V) 1	(V) 4		
District II	1,413	1,730	675	323	47
		(I) --	120	Canada 100%	Canada 100%
		(III) 1,456	534		
		(IV) 274	21		
District III	7,816	15	71	--	60
		(II) 4	68		Carr. & S.A.
		(IV) 11	3		
		(V) --			
District IV	709	--	46	48	9
			(III) 27	Canada	Canada
			(V) 19		
District V	1,320	39	154	380	104
		(III) 8	(III) 60	Canada 58%	Carr. & S.A. 87%
		(IV) 31	(IV) 94	Indo. 19%	Canada 13%
				S.A. 6%	
				M. East 17%	

From the foregoing, it can be seen that OCS oil and gas would tend to serve the same areas. If onshore production is to serve as an alternative, production would have to come from areas that similarly could serve the Midwest and the East Coast. For gas, Chart I depicts the regional distribution of natural gas production to consuming regions in 1970. It can be seen that both the East Coast and the Midwest depend heavily on South Louisiana and Texas Gulf Coast. Since 1967 reserves have been declining in the Texas Gulf Coast and have been declining since 1965 in South Louisiana. With regard to oil, the 1970 supply distribution patterns are shown in Chart 2. It can be seen that PAD III would be the main source of any deficit resulting from not holding the sale.

If NPR 1 at Elk Hills, California were developed the oil and gas would not logically be transported to either the Midwest or the East Coast markets. The same is also true for North Slope oil, if delivered to the West Coast as proposed for The Trans-Alaska pipeline route of delivery.

The following section presents a discussion of environmental aspects of onshore oil and gas development in the lower 48 States and Alaska.

b. Environmental Impact - Lower 48

(1) Impact on Air Quality

The impact of additional petroleum production on air quality stems principally from the emission of particulates into the atmosphere; however, some disturbance results from noise and vibrations.

Particulates

Engine exhausts from boats, vehicles and stationary engines result in emission of the products of combustion that pollute the air. The impact of this pollution from the level of activity normally associated with increases in petroleum production is dependent upon climatic conditions, topography, and localized conditions. Air quality in immediate areas will undergo some reduction because of removal of ground cover operations, dust from vehicle traffic, and from occasional equipment failure or blow-outs. Quality reduction is generally of a temporary nature and has a short-term effect.

Vapor venting from storage tanks and vessels, the burning of waste petroleum and chemical products, especially those containing some sulphur compounds, could result in not only increases of particulates into the atmosphere, but the emission of objectionable odors. These impacts on the environment are also of a short-term nature.

Noise and vibrations

Noise and vibrations from stationary engines used in drilling and production operations and transporting systems disturbs the natural environment. The impact exists only for the timeframe that the engines are in use.

Effects of air quality reduction

It is highly unlikely that air quality reductions from operations associated with increased petroleum production would significantly alter biological conditions affecting the growth of flora. The feeding and nesting habits of birds and animals, wilderness qualities and hunting could be altered as a result of noise and vibrations associated with increased petroleum operations. After termination of operations a reversion back toward original conditions would be expected.

(ii) Impact on water quality

Access to Area

The construction of roads for access into prospective petroleum produci areas could affect water quality in that drainage patterns are disturbed and some erosion is possible. The dredging of canals could result in increased turbidity and resuspension of bottom sediments as well as salt water intrusion.

Production Operations

Entry of foreign substances such as oil, chemicals, brine, and waste materials into the water cycle is one of the major environmental risks associated with petroleum production operations. Spills or leaks allowing oil, brine, and waste substances to enter the water cycle can result from human error; external corrosion of pipelines and container vessels; pipeline breaks from vibrations, earthquakes, landslides, ruptures, or mechanical failures; burning pits and open ditches and blowouts. Methods to recover and contain spills are being improved. During production, large amounts of salt water are usually produced as oil fields age. Such water can create pollution problems from producing wells on land or freshwater-covered areas. According to a study of the Interstate Oil Compact Commission (IOCC) up to 25 million barrels of salt water are produced daily from the Nation's oil wells. Proper disposal of produced brines has been and continues to be of major concern to producing operators, and regulatory agencies.

Subsurface disposal is strictly regulated by some state conservation agencies and disposal of salt water is not permitted in freshwater streams.1/

The principal causes of water pollution from barges transporting petroleum on inland and coastal waterways are loading and unloading operations; collisions; ship operations, such as bilge disposal; and human error. Data compiled from the Pollution Incident Reporting System (PIRS) of the U. S. Coast Guard show that there were 295 spills attributed to barges in 1970. Average size of the spills was estimated to be approximately 66 barrels per spill. Even though spill control methods are being improved, increased movement of petroleum has increased this pollution problem.

Effects of Water Quality Reduction

Reduction of water quality through removal of vegetation, changes in drainage patterns, and erosion results in turbidity and siltation of water reservoirs and estuaries. Turbidity is considered to be of short-term duration but can affect flora, fauna, and fishing.

Siltation of water reservoirs and estuaries has long-range environmental impacts in that the shape and size of the water basin is altered which could have an adverse impact on flora, fauna, recreation activities, aesthetic qualities and perhaps disturb ecological food chain relationships.

The reduction of water quality and its attendant consequences from introduction of oil, chemicals, brine, and waste materials into the water cycle ranks as a major environmental risk resulting from increasing petroleum production. The introduction of oil or brine into the water

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1/ National Petroleum Council, Environmental Conservation, The Oil and Gas Industries, Vol. II, 1972, p. 147.

cycle can result in adverse biological conditions affecting trees, shrubs, grass, crops, and aquatic plants, birds, land animals, and fish. The adverse effect of oil or salt water on environmental quality is not of long-term duration. Oil spills in shallow water, sheltered lagoons and estuaries, however, impose natural dispersal restriction, causing the oil to remain trapped or concentrated in such areas for long periods. Consequently, in some localities, this adverse effect could be long-term. Wildlife feeding grounds could be damaged. Emulsifiers and wave action remove oil from the surface by redistributing it as minute droplets throughout the water. In this form, pollutants can be harmful to waterfowl if ingested. Generally, the degree of reduction in water quality will determine the duration of environmental impact. Major reductions in water quality that significantly disrupt the food chains in bays, lagoons, and estuaries could have long-term environmental effects.

(iii) Impact on Land Quality

The modification of land form necessary for petroleum production results in varying degrees of environmental impacts on the physical and chemical land characteristics, biological conditions, cultural factors, and ecological relationships.

Access to the Land

Depending upon the terrain and local conditions, access to the land is normally from existing road networks, extension of these roads, and expansion of trails. For initial exploratory work, minimum alternations are made in roadway systems. After decisions are made to drill in a given area, an improved road system is required for the transportation of heavy loads. The drilling site must be cleared of vegetation which present obstacles. Once production has been established newly constructed roads are normally improved. From these operations environmental impact can result from removal of top soil and surface vegetation to establish right-of-way corridors and location sites; and alternation of drainage patterns and watershed cover.

Principal environmental land degradation from petroleum operations results from spills of oil, chemicals, or brine and the disposal of waste materials.

In the construction of roadways surface vegetation is removed and drainage patterns are modified. As a result, erosion can occur. Erosion results in changes in landform. Trees, shrubs, grass, and crops are directly affected by removal and may be subjected to indirect affects by modification of drainage patterns and erosional siltation. Although nature attempts

to repair environmental degradation, external help may be required. Soil erosion and siltation can have both direct and indirect impacts upon the normal behavior and activity patterns of wildlife. Small animals and birds would not be significantly affected, although their number in the immediate vicinity of the operations would decrease in proportion to disturbances and lost habitats.

The magnitude of the impact of expanded road networks on the regions' aesthetic, cultural, and recreational qualities would depend upon local conditions and the extent of construction. For initial exploratory activities normally only minor expansion to road and trail systems need be made. These expansions are of a temporary nature but do result in short-term interruptions of land use for grazing and agriculture. Recreation in the area, especially hunting, could be disturbed for the short-term, but it can also be aided by the availability of the roads. Some aesthetics such as wilderness qualities and landscape design may be affected for longer timeframes because of the necessity in some areas of establishing corridors.

For drilling, production, and transportation operations, the roadway system must be improved over that of exploration activities. There is increased vehicle and truck traffic, heavier loads to be transported, the need for access for maintenance in all types of weather conditions, and right-of-way corridors required for the producing and transportation of petroleum throughout the life of these operations. Additional disturbances to the land form and removal of additional surface vegetation, shrubs, and trees together with disturbances in water drainage patterns can result in sedimentation and erosion processes that affect

not only flora biological conditions, but result in disturbances of fauna. The habitat of birds and animals may be altered beyond the life of the producing and transporting operations. Land use and recreation activities are also disrupted during drilling, producing and transportation operations. Aesthetic and human interest factors are affected for time-frames beyond the terminations of operations. Scenic views and vistas, wilderness qualities, and physical features in some localities could undergo alterations that could be considered permanent transformations. Population density, employment, and cultural life styles would change from drilling, production, and transportation operations. The degree of change would be dependent upon activity levels. The change would be of long-term impact and directly affect access, utility networks, waste disposal, and creation of additional corridors. These effects would not necessarily be adverse.

While the construction of pipeline facilities has the potential for causing unfavorable environmental effects, the employment of good construction techniques can minimize or even eliminate most of these effects. Farming or grazing lands can usually be restored to their original condition after no more than one growing season by the replacement of top soil and the replanting of grass or crops. The aesthetics of wilderness areas can be preserved by using existing rights-of-way or minimizing the width of new rights-of-way, and by replacing grass and shrubs on the rights-of-way, and by using such techniques as feathering and screening or deflecting entrance ways. Any displacement of wild animals will occur only during the construction. Banks can and should be stabilized to avoid erosion during construction. Access and service roads should be maintained with proper cover, water bars and appropriate slope to avoid soil erosion. Compressor stations and other aboveground

facilities can be located in unobtrusive sites and planted with appropriate trees and shrubs to enhance their appearance; location, planting and exhaust design can be used to abate excessive noise associated with operation of the compressor stations. Treatment plants can be located and equipped with devices to minimize any adverse effects upon air quality and suitable means, e.g., evaporation ponds or disposal wells, can be found for preserving the water quality of the surrounding area.

Obviously, every effort should be taken to avoid the construction of pipelines facilities in parks, scenic areas, wildlife refuges and places noted for their historic value.

A potential source of land pollution is a blowout during drilling but the frequency of blowouts is small. One hundred and six blowouts occurred in drilling 273,000 wells in 8 major oil producing States from 1960 through 1970. Most blowouts are from high pressure gas rather than oil. Other pollutants from blowouts are drilling mud and salt water. 1/

1/ Environmental Conservation, The Oil and Gas Industries, Volume One, June 1971, National Petroleum Council, p. 63.

(iv) Impact of operations

Perhaps the greatest adverse environmental impact from operations results from oil, chemicals, brine, or waste material pollution. This pollution can result from spills, leaks, blowouts, human errors, or equipment failure. Although care is exercised to prevent land pollution, there are no fail-safe methods to completely protect the environment.

Land pollution from operations, primarily salt water and accidental oil spills, can result in soil sterilization that could be of a long-term nature and affect not only the topsoil but underground water quality. These problems were mentioned earlier. Vegetation, microflora, and crops can be adversely affected for short or long-term duration depending upon the volume and toxicity of the pollutant, resistance of the flora, and the techniques and technology employed. Alterations of the flora in turn affect the habitat of animals and nesting, feeding, and presence of birds. Nature has a tendency to overcome the imbalance and in some cases can repair the environmental degradation in a short term. Depending upon the degree of pollution, land uses such as agriculture, grazing, forestry, and wilderness can be altered for varying time frames. In some cases large pollutant concentration could be sufficient to kill vegetation, trees or crops and disrupt wilderness areas for long terms. Recreation in areas subjected to large pollutant concentrations can also be altered for long time frames, whereas nature tends to overcome small environmental imbalances.

Depending upon local conditions, aesthetics such as scenic views and vistas, wilderness qualities, unique ecosystems, or historical sites and objects may be altered. The degree of alterations would be dependent upon the degree of pollutant introduction and local conditions. Ecological relationships such as food chains, salinization of soil and water resources could result from pollutant contamination. The degree of contamination has a bearing upon the term of environmental impact.

In exploring and pipelining, any spills that occur normally would be small. Major spills could occur in drilling, production, and in the transportation of petroleum liquids by marine transportation. The Federal Water Quality Administration (EPA) estimated that 10,000 oil spills occur a year of which 2,500 are ground spills. 1/ Most ground spills cause little ground pollution. According to the 1970 report of the Office of Pipeline Safety (Department of Transportation) on spills incidents, there was a total of 347 liquid pipeline accidents. In those accidents spills averaged approximately 1,780 barrels of crude oil. Principal cause of over 50 percent of accidents was corrosion. Many onshore pipelines are old, dating back to 1920's before techniques for protection against corrosion became widely used and continued accidents can be expected from these lines. With the development and expanded use of cathodic protection of pipelines, fewer accidents in new lines would be expected but accidents from old lines will continue to be of concern.

1/ National Petroleum Council, Environmental Conservation, op.cit., pg. 146.

Most operational occurrences that adversely affect the environment result in small amounts of pollutants being introduced into the environment. Nature tends to overcome the imbalance and environmental impact is generally of short-term duration.

c. Relationship to Alaska North Slope Oil

Under the Trans-Alaska Pipeline proposal, all of the North Slope Oil would be delivered to the West Coast (PAD V) within the first few years after full production. Therefore, North Slope Oil cannot be considered an alternative for production from the proposed OCS lease sale since 99 percent of the oil from the proposed sale would be consumed outside PAD V.

d. Advantages of the Alternative

Increasing onshore production to replace anticipated reserves of oil and gas from the proposed OCS sale, would allow more time for other energy sources to be developed and therefore possibly decrease the need for reliance on future offshore development. Environmental impact of oil and gas development in the lower 48 States can be avoided or minimized by proper planning, and the utilization of available construction techniques Accidents could result in spills, but possibilities of such accidents are considered minimal. In the event spills or leaks occur, most of the pollution can be confined to a limited area. The overland transportation of the oil and gas is similar in impact to the onshore transportation phase of offshore production. In comparison with other alternatives, this option avoids the problem of substitutability in that oil and gas are being supplied in forms required for existing use facilities and environment, thereby avoiding the need for conversion to use another form of energy source.

The enhanced economic position of the onshore petroleum industry would tend to compensate for the reduction of income to the offshore industry if the proposed sale were not held, but there could be some dislocation among individual companies.

Substantial reserves exist in the Naval Petroleum Reserves both in the lower 48 States and on the North of Alaska, adequate to sustain production higher than that anticipated from the proposed sale.

The most economically attractive onshore sources of oil and gas are located either on the Naval Petroleum Reserves No. 1 and 4, or on the Alaskan North Slope. Exploitation of the Naval Petroleum Reserves would negate the national security purposes for which they were established. Exploitation of the oil resources of the North Slope of Alaska is contemplated by the oil companies concerned, and an application for a permit for a pipeline to bring the oil to market is under consideration. Issuance of such a permit would result in the exploitation of the North Slope. North Slope oil is not, however, presently intended for the same markets now being served by the Louisiana OCS. Alaska gas would not be made available until a route is agreed upon for a gas pipeline and the construction is allowed to take place.

Additional production from onshore sources other than the Naval Petroleum Reserves and the North Slope would likely be from existing provinces where production is not now deemed economic. Stimulation of additional

exploration and production probably would require subsidy of some form for onshore production, or a general rise in prices of oil and gas. A general price rise of this type would not alter relative economics; that is, development of offshore resources would continue to be preferable on economic grounds. Either measure--subsidy or price rise--would impose additional costs on the consumer and the economy.

3. Increased Nuclear Power

The nuclear power alternative has been reviewed and commented on by the Atomic Energy Commission. Where possible, the text has been revised in accordance with their written and informal comments.

a. Description of the Alternative

The use of nuclear power as a commercial electrical energy source is expected to increase considerably in the next 15 years. Installed capacity in 1970 was approximately 7,000 MW. This is projected to increase to 47,000-61,000 MW by 1975, 139,000 MW by 1980, and 286,000 MW by 1985.

Most of the currently operating and planned nuclear plants utilize light water reactors. In such reactors, the heat energy created in nuclear fission is removed by the circulation of water through the fuel core to generate steam to turn turbine generators to produce electricity. Four high-temperature, gas-cooled reactors are also completed or on order. These utilize helium circulating through the fuel core to boil water for steam to turn the turbine generators. These reactors are all of the burner type which utilize less than 2% of the available energy from the uranium which they burn. Breeder types of reactors, which produce more nuclear fuel than they consume, such as the liquid metal fast breeder, are not expected to be available for commercial use until the mid 1980's. Breeder reactors could utilize more than 60% of the total energy from uranium. Thermonuclear fusion reactors are not expected to be a commercial reality much before year 2000.

Since planning, licensing, and construction lead times are approximately six to eight years, no new additional nuclear plants could be expected to be a substitute for any OCS oil delivered before 1980.

However, subsequent to 1980, nuclear power plants generating electricity could be considered as a substitute for expanded oil and gas production from OCS leasing to the extent that electrical energy could directly replace oil and gas uses. For the size of incremental production estimated to be provided from the proposed leases, additional nuclear power plants could substitute for oil and gas fired electric generating power plants that otherwise would be supplied by the proposed lease. Electricity produced from nuclear power also could substitute for house-hold heating to the extent that heating oils and natural gas would come from OCS leasing.

On the assumption that all of the oil and gas production from the proposed leases would be used to provide fuel for additional oil and gas fired power plants, four to eight additional nuclear plants of 1,000 megawatts capacity each would have to be constructed and in operation between 1980 and 1985. This would be as much as two or more years later than the additional production would begin from the proposed OCS lease. 1/ This would represent approximately a four percent increase in planned capacity.

b. Environmental Impact of the Alternative

The precise environmental impact of additional nuclear plants cannot be assessed until site location, reactor types and construction

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1/ The proposed leases are estimated to provide 75-150 thousands bbls. of crude oil and 250-500 million cu. ft. of natural gas per day six years after leasing. This is the energy equivalent of 245-490 trillion BTU annually, 670-1340 billion BTU daily, and 28-56 billion BTU hourly.

methods are determined. Therefore, their impact can be discussed only in general in the subsequent text. Environmental problems which could occur as a result of substituting nuclear power for oil and gas generating power include those associated with surface and subsurface mining of uranium ore, changes in land use, disposal of the waste heat generated by the less efficient nuclear plants, a very small risk of a serious accident, and the safe storage of highly radioactive waste materials.

(i) Uranium Mining and Milling

The construction and operation of additional nuclear generating plants would require additional mining and milling of uranium ore to supply the fuel elements for these plants. An incremental operating capacity of 6,000 MW by 1985 would require 3,400 tons of U_3O_8 for the first core fuels and 1,000 tons of U_3O_8 for annual reloads without plutonium recycling and 800 tons of U_3O_8 with plutonium recycling. At an average ore grade of 0.20 percent U_3O_8, a total ore output of over 1.6 million tons would be required to supply the uranium for the first core fuels, and an annual output of 0.4 or more million tons would be required for reloads. As most of the known and potential reserves are concentrated in New Mexico, Wyoming, and the Colorado Plateau, the incremental mining and milling activity would be expected to occur there. In 1970, 53% of production came from underground mines, with most of the remainder coming from open-pit mines.

The mining and milling of uranium ore creates certain environmental problems, particularly land use conflicts and biological hazards. Most of these can be prevented or minimized by utilizing known measures.

In underground mining in the 1950's excessive exposure to radioactive radon daughter products 1/ resulted in a high incidence of lung cancer. However, the recommended annual exposure limits have been vastly reduced in the past decade. By maintaining these lower limits, the incidence of lung cancer among underground uranium miners is expected to be reduced to a level not significantly higher than that of the population as a whole.

Uranium mining is largely concentrated in relatively isolated semi-desert areas distant from large population centers and urban areas. Nontheless, it does have an adverse aesthetic impact in the areas in which it occurs, from the removal of the vegetative cover and the creation of overburden and waste rock. Open-pit mines require considerable acreage, reducing the suitability of that area for other land use such as grazing, wildlife, and some outdoor types of recreation. 2/ For underground mining, the extraction of ores will require some accumulation of waste rock in dump areas. Planning for sequential land use, followed by the reclamation of mined land and the backfilling of mined-out stopes and pits with waste rock, can substantially reduce these land use problems. Such measures will be taken whenever possible.

1/ Radon is a radioactive gas produced by spontaneous decay of uranium. The gas disintegrates spontaneously into so-called daughter products. In the process of spontaneous disintegration, highly radioactive emissions occur.

2/ At 7' thickness of ore body, 800-1,000 acres would supply fuel for 10,000 MW for 25 years including initial loading.

Because of the low concentration of U_3O_8 in uranium ore, milling the ore produces considerable amounts of tailings. The milling operation for 6,000 MW of capacity over a 25 year operating life would generate some 12 million tons of tailings. These tailings contain radioactive products and therefore must be retained in well-constructed tailings dams to prevent erosion and leaching, which could result in the radioactive products entering surface and ground water systems. The specific adverse effects of these on the overall health of biota are not fully known; current evidence does, however, indicate increasing concentrations through upward stages of food chains. Adequate methods do exist and are being used to prevent potential adverse effects of milling operations.

Because of their low-level radioactivity, mill tailings are unsuitable for subsequent use as fill material where human exposure might result. They are also a hostile environment for nearly all biota. Above-ground storage which minimizes erosion requires that they be covered with gravel or dirt upon which a vegetative cover can be established. Above-ground storage does require considerable land area, which displaces other potential uses. 1/ Subsequently, in the future an increasing amount of tailings may be utilized to backfill mined-out stopes and open pits.

1/ In a tailings dam 60' high, one million tons covers an area of 5 acres. Thus, 12 million tons could be contained in 60 acres.

(ii) Power Plant Construction and Operation

Assuming an average of three 1,000 MW units per site, the construction of 6,000 MW of additional nuclear capacity by 1985 could require two additional plant sites (less if some units were added to existing plants). Under current siting criteria, these would be located at some distance from population centers. Assuming 500 acres per site (based upon an exclusion area of one-half mile radius around each plant), these plants would require a total up to 1,000 acres from which other uses would be excluded.

Depending on the capacity of the transmission lines which would be required if nuclear energy were to substitute for the production from the proposed OCS sale, the transmission line rights-of-way would require the use of ten to fifteen acres per mile of line. Certain types of development such as residences, would be excluded although such land would still be largely available for other purposes, such as recreation. These additional transmission lines would have an adverse aesthetic impact by disrupting some scenic vistas.

Construction of the plants would present some short-run environmental problems, such as the erosion of excavated materials. Special measures to prevent erosion of excavated materials with subsequent siltation will be taken.

Operation of the nuclear plants will generate considerable amounts of waste heat given their comparatively lower thermal efficiency (around

33% compared to 40% for new fossil-fueled thermal efficiency plants). Given this difference in efficiency and on the assumption that fossil fuel plants release around 15% 1/ of their waste heat directly into the atmosphere, a light water reactor would release approximately 50% 2/ more waste heat into its cooling water than a fossil fuel plant of similar size. The effects of this waste heat will depend upon the cooling method used and the location of the plant.

Assuming a 15-20 degree F temperature rise, a "once through" method of direct discharge into the original source for a 1,000 MW plant would require 270-360 billion gallons of water per year. The effects of using a "once through" method of cooling heated water depend in part on the size of the body of water into which this heated water is discharged. The effects along ocean sites, the Great Lakes, and very large rivers are likely to be modest as the heat is more readily dispersed and more easily avoidable by aquatic species. Along smaller lakes and rivers or in bays with limited circulation, the effects can be more significant. Within the affected areas, higher water temperatures can produce fish kills, interfere with fish reproduction, disrupt food chains, decrease dissolved oxygen content, drive out desirable aquatic species and encourage the growth of undesirable algae which may speed up eutrophication. However, sometimes the heat can be used for aquaculture and other beneficial uses.

1/ Energy Research Needs, Oct. 1971, Section IX, Resources for the Future, p. 19.

2/ Ibid, Section VI, p. 15.

The use of wet cooling towers, removing the heat by evaporation into the atmosphere, would not pose the problems of adverse thermal effects. However, water vapor from the cooling operations could have substantial effects on local haze, fog, cloud, and ice formation. Chemicals released in the cooled water or evaporated plume could also have adverse effects on downstream and downwind biota.

The use of cooling ponds would produce less evaporation than wet cooling towers, but haze, fog, cloud, and ice formation would still occur during periods of sub-freezing temperatures. The ponds require additional acreage (an estimated 1,000-2,000 acres per 1,000 MW unit.) These may have recreational uses, but they would also displace previous land uses.

Nuclear power plants, unlike fossil fuel plants, do not emit the usual products of combustion such as particulates, sulphur oxides, and nitrogen oxides. Hence, they do not generate the air pollution problems stemming from, or require control measures for, such emissions. However, they do produce radioactive emissions whose release must be strictly limited if adverse affects to the health of humans and other biota are to be avoided.

In the normal operation of the incremental nuclear generating units, there would be very small amounts of radionuclides discharged in the cooling water and gaseous plant effluents. But, assuming that present standards will be maintained and enforced (these limit the release of radioactivity to no more than would expose an individual at the plant boundary to 1% of the individual maximums allowed), the effects of the

amounts released are likely to be negligible, as the average additional annual dose which the affected population would receive would be three to four orders of magnitude less than the average level of natural radiation exposure.

The operation of nuclear plants poses some risk of accidents. Nuclear plants are designed to minimize accidents or their adverse effects if one does occur, utilizing a "defense-in-depth" principle. This includes designing and constructing plants in such a way that accidents are prevented, designing and constructing plants to contain the effects of accidents which do occur, and siting reactors away from areas of high population density. Plants are designed to withstand a design basis accident (DBA), defined as the worst malfunction considered to have a probability of occurrence high enough to warrant corrective action. For light water reactors, the worst DBA considered is usually a major rupture in the cooling system. The maximum radiation dose which could be received at the site boundary if such an accident occurred is estimated for some plants to not exceed the annual dose obtained from natural radioactivity.

(iii) Transportation

The nuclear fuel cycle requires the transportation of radioactive materials by truck or rail at several stages. The transportation of spent fuel elements from reactors to processing plants and of high-level waste from reprocessing plants to storage sites poses a potential hazard of considerable magnitude. Existing

transportation regulations and cask designs have been developed to insure that even if accidents in transporting these materials do occur, no radioactivity will be released to the environment. For the transport of the spent fuels and high-level wastes associated with an incremental 6,000 MW capacity, a very small number of accidents could be expected to occur during a 25-year operating life. However, these are not expected to produce any major adverse effects other than those which could be expected from any other transportation accident.

(iv) Fuel Reprocessing and High-Level Waste Storage

Spent fuel assemblies from reactors are first partially cooled at the plant site and then transported to fuel reprocessing plants where usable nuclear fuel materials are recovered from them and radioactive wastes are separated. Existing reprocessing capacity is sufficient to handle this relatively small incremental load as an alternative to the production from the proposed OCS sale.

While radioactive emissions during reprocessing are greater than those occurring during normal power generation, the estimated dose to the affected population is still two orders of magnitude below natural levels. Hence, the impact of these emissions is not expected to be significant, even though the chronic effects of such low level radioactivity are not yet wholly known.

The high-level radioactive wastes remaining after reprocessing are first concentrated and stored in solution for five years, then evaporated to solids, sealed in containers, and put into long-term storage.

The 6,900 MW of incremental capacity would produce around 48,000 to 64,000 gallons of high-level waste per year, using a cumulative storage capacity of 240,000 to 320,000 gallons. This liquid waste, when evaporated, would yield around 480 to 640 cubic feet/year in solid waste materials for each year of operation.

Because of their high concentrations of radioactive nuclides and very slow rates of decay, these waste materials must be isolated from the biosphere for hundreds of thousands of years if adverse effects to living organisms are to be totally avoided. The concept of storage in salt beds has been termed satisfactory by a National Academy of Science Advisory Ccmmittee. Pilot studies have been conducted for several years and are continuing to determine the acceptability of the specific sites. In the meantime, waste will ccntinue to be stored in below surface man-made engineered storage facilities.

References

Joint Committee on Atomic Energy, Congress of the United States, Environmental Effects of Producing Electric Power, Part 1, 91:1 (Washington: Government Printing Office, 1969)

National Petroleum Council, U.S. Energy Outlook: An Initial Appraisal, 1971-1985, Vol. II (November, 1971)

Patterson, John, U.S. Atomic Energy Commission, "Outlook of Nuclear Fuel", paper presented September 29, 1970 at IEEE-ASME conference, Pittsburg.

Resources for the Future, Inc. Energy Research Needs (October, 1971)

Rock, R.L., and Walker, D.K., U.S. Bureau of Mines, USDI, Controlling Employee Exposure to Alpha Radiation in Underground Uranium Mines (Washington: GPO, 1970)

Oak Ridge National Laboratory, Siting of Fuel Reprocessing Plants and Waste Management Facilities, ORNL-4451 (July, 1969)

U.S. Atomic Energy Commission, Draft Detailed Statement of the Environmental Consideration Related to the Proposed Issuance of Operating Licenses to the Florida Power and Light Company for Turkey Point Plant Units 3 and 4 (February, 1972)

USAEC, Draft Supplemental Detailed Statement on the Environmental Considerations Related to the Proposed Issuance of an Operating License to the Wisconsin Electric Power Company for Point Beach Nuclear Units 1 and 2, (February, 1972)

USAEC, Environmental Statement: Radioactive Waste Repository, Lyons, Kansas (June, 1971)

USAEC, The Nuclear Industry - 1971 (Washington: GPO, 1971)

U.S. Bureau of Mines, USDI, Mineral Facts and Problems, 1970 Washington: GPO, 1970)

4. Increased Use of Coal

Since coal is the most abundant fossil fuel in the Nation, full consideration must be given to its use in solid form. A separate discussion is given on the feasibility of coal based synthetics in a later section.

The major problems associated with increased use of coal as a solid fuel are those associated with the meeting of air quality restrictions. These are particularly signifcant relative to power generation uses since the largest market for coal is in the eastern portion of the Nation where coal quality, in terms of sulphur content, tends to be the lowest. The major deposits of low sulphur coal are in the western states. Considerable research is being devoted to the development of economically feasible processes for the treatment of coal before burning to remove excess sulphur, to improve combustion processes, and to remove pollutants from stack gases after combustion. Where air quality standards can be met, coal substitutes for oil in power generation when facilities are designed to use solid fuels. To the extent of such substitution feasibility, including factors of geographic energy source and use patterns, coal could be considered as a potential partial substitute for oil produced from the East Louisiana sale.

The following sections describe the problems of use of coal as a solid fuel and the related mining and processing factors.

a. Description of the Alternative

Coal underlies 458,600 square miles in 37 states. The remaining coal resources were estimated, as of January 1, 1967, to total 3,210 billion short tons. 1/ The Department of the Interior slightly revised that estimate to 3,200 billion short tons in January 1972 and further estimated that 2,800 billion short tons are at depths less than 3,000 feet, and 1,600 billion short tons are less than 1,000 feet below the surface. About 390 billion short tons are commercially recoverable under present economic conditions and mining technology. 2/

The quality of coal has become increasingly important as restrictions are updated, and new regulations are imposed by local, State, and Federal governments on the utilization of fuel containing excessive quantities of sulphur, nitrogen, and particulate matter. As a result of these restrictions, low-sulphur coal, or coal containing less than one percent sulphur, is in great demand for power generation, steel, and manufacturing. Throughout the United States, utility companies in particular and other fossil fuel consumers are being forced by public demand and law to use low-sulphur coal.

1/ Paul Averitt, "Coal Resources of the United States: January 1, 1967", U. S. Geological Survey, Bulletin 1275, p. 1, 1969.

2/ U. S. Congress, Senate Committee on Interior and Insular Affairs, The President's Energy Message, A National Fuels and Energy Policy Study Hearings, 1971, 92nd Congress, 1st Session, p. 90.

At present, the greatest need is for low-sulphur bituminous coal with a low ash fusion temperature for use in the power plants of the eastern United States. There is an acute shortage of this type of coal east of the Mississippi River; however, there is an abundant supply of low-sulphur bituminous and sub-bituminous coal and lignite in the Rocky Mountain States that could be used in power generation.

The remaining resources of low-sulphur bituminous and sub-bituminous coal and lignite in the Rocky Mountain States were estimated to be 874 billion short tons as of January 1, 1967. 1/ Of this amount 188 billion short tons of the remaining resources are in beds, usually ten feet or more thick, and less than 1,000 feet below the surface. The recoverable resources are about 440 billion short tons to a depth of 3,000 feet and 94 billion short tons to a depth of 1,000 feet.

Since 1967, coal production in the Rocky Mountain States has been about 100 million short tons. Therefore, it is assumed that 94 billion short tons still are available as of January 1972. 2/

Approximately 45 billion short tons of the recoverable resources could be extracted by open pit mining, 3/ and 25 billion short tons are so well-known as to character, thickness, and tonnage that they are considered as reserves. 4/

1/ Averitt, op. cit., p. 33.

2/ Averitt, 1972, oral communication.

3/ Ibid.

4/ USDI, Bureau of Mines, "Stripable Reserves of Bituminous Coal and Lignite in the United States", Information Circular No. 8531, p. 15.

It is estimated that the East Louisiana sale will produce 75,000-150,000 barrels of oil per day and 200,000-400,000 MCF of gas per day. The energy supplied by this sale would be equivalent, on an annual basis, to the energy produced by 10-20.9 million short tons of 11,000 Btu/lb. coal. In the five-year period from 1980 to 1985, production from the sale would supply the equivalent of from 51 to 104.6 million short tons of coal.

The coal resources of the Rocky Mountain States, if interchangeable for other energy source forms, could be more than adequate to provide the energy needed even if the East Louisiana sale is not held. The degree of its substitutability in solid product form could be a controlling factor, especially in light of the gasoline constituent of crude oil production. The impact of developing a coal industry capable of producing approximately 100 million short tons of coal during the five-year period from 1980-1985 might also have substantial environmental and socio-economic effects.

At present, very large open pit coal mines may produce five million short tons of coal per year. Very large underground mines may produce 2 million short tons per year. In order for the Rocky Mountain coal industry to produce the additional 10-20.9 million short tons needed each year from 1980-1985, approximately 11 large underground mines or five large open pit mines, or smaller mines, or some combination thereof, would be necessary. Such mines could become operational after considerable planning based on determining the adequacy of large reserves, adequacy of

water supplies, construction of utility and transportation facilities, and determination of market requirements. Finally, a labor force would have to be found and trained to produce the coal within the health and safety standards of the Federal government. Local, State, and Federal Government regulations regarding air, water, and noise pollution also would have to be met.

About 36 percent of the coal land in the Rocky Mountain States is owned by the Federal Government. The remainder is largely owned by Indian tribes, Western railroads, and State governments. The Department of the Interior is responsible for leasing and managing public and Indian-owned coal-bearing land.

Many very thick and closely spaced beds of lignite and sub-bituminous coal, containing about one-half of the remaining coal resources in the Rocky Mountain States, underlie the northern part of the Great Plains. The coal generally has a low ash fusion temperature, a low-sulphur content, a substantially reduced heating value, and high volatile matter content. These characteristics suggest that this coal would be preferred for power generation, gasification, and liquefaction.

The coal resources of the Northern Great Plains are so large that the locations of many open pit and underground mines would very likely be dictated by proximity to adequate water supplies, existing transportation facilities, and nearby planned power plants. Most of the larger

deposits are owned by the Federal Government, Indian tribes, railroads, and State Governments. Therefore, the mining, rehabilitation, and environmental controls and procedures practiced by most mining operations would be administered by the Department of the Interior and cooperating State governments and railroads.

The total remaining coal resources in the basins of the Rocky Mountain are very large, nearly as great as those in the Northern Great Plains, but extremely thick beds are a rarity rather than a common occurrence.

At a few localities within the Rocky Mountain States, deposits of metallurgical grade bituminous coal and anthracite are known; some of these deposits are actively mined. Generally, the coal from these deposits is not suited for power generation, gasification and liquefaction.

As in the case of the coal resources of the Northern Great Plains, the coal resources of the Rocky Mountain basins are so large that the locations of open pit and underground mines would likely be determined by nearness to adequate water supplies, transportation facilities, and the plans for mine-mouth power plants. About 45 percent of the coal resources of the basins is owned by the Federal Government, 13 percent by Indian tribes, 13 percent by State governments, and 12 percent by railroads. The large amount of governmental ownership of the resources indicates again that mining, rehabilitation, and environmental controls

and procedures imposed on mining operations could be fully effective, since they would be administered in large part by the Department of the Interior and cooperating State governments.

b. Use of Coal as a Solid Fuel

The expanded use of coal power generation could be a viable alternative to the use of less abundant fossil fuels (oil and gas) and nuclear energy. Major limiting considerations are those associated with the extent to which it can substitute for the form of energy source to be displaced and the solving of problems associated with the meeting of air quality standards.

The sulphur content of U.S. coals ranges from 0.5 to over 7 percent. About 65 percent contain 1.0 percent or less, and most of such coals are found in the western states, far removed from the area served by oil and gas produced from the proposed East Louisiana OCS sale.

Most current production comes from states east of the Mississippi from which only 20 percent of the reserves contain 1.0 percent or less sulphur while 43 percent contain more than 3.0 percent sulphur. Unless control measures are available and employed, during combustion sulphur oxides are emitted to the atmosphere causing undesirable air pollution environmental impacts in direct proportion to the sulphur content of the coal feedstock.

Recent environmental regulations applicable to new electric generating facilities restrict the emission of sulphur dioxide to 1.2 pounds per

million Btu to fuel as fired; for bituminous coal, this is equivalent to about 0.7 percent sulphur. It is necessary, therefore, to reduce the sulphur content of the coal prior to burning or to remove sulphur oxides from stack gases following combustion in order that coal may continue to be used for power generation.

Mechanical cleaning of raw coal is only a partial solution to the problem, since only a small fraction of Amercian coals can be cleaned sufficiently, to meet sulphur emission controls and standards. Mechanical cleaning affects only pyritic sulphur and leaves untouched the 40 to 60 percent of the sulphur that is bound in the organic structure of the coal. In addition freeing the small particles in which pyrites occur requires fine grinding prior to cleaning, which in turn adversely affects the cleaning efficiency and restricts the methods of cleaning that can be applied. Tests of some 322 coals representing most of the steam coals produced in eastern U.S. showed that, under optimum conditions and present technology, less than 20 percent of these coals could be cleaned to 0.7% sulphur (Bureau of Mines).

The status of technolpgy for abatement and control of sulphur oxides in combustion gas was recently reviewed by the National Academy of Engineers, National Research Council, whose report concluded that ". . . commercially proven technology for control of sulphur oxides from combustion processes does not exist". The conclusion remains valid, although a number of systems are either being installed or operated at the present time on commercial

plants to determine the operational and economic feasibilities of the processes. 1/

President Nixon in his June 4, 1971, message to the Congress on Clean Energy emphasized the need for a greatly expanded effort on sulphur oxide control technology. Federal funding is being directed to demonstrate six different techniques during the next three or four years.

Coal reserves are ample to meet virtually any demand for which they can qualify. However, even if the sulphur content of coal is reduced to 0.7% (extremely difficult for most coals using existing technology), sulphur oxide emissions per Btu (units of energy) would still be 1/3 higher than that from oil with the same sulphur content (but much more readily achievable, and routinely achieved in commercial applications).

Total costs of cleaned coal, for processes which do not achieve 0.7% sulphur concentrations, have variously been estimated at $3.63 to $4.53 per ton. 2/ The President's proposal for a sulphur emission tax could limit sulphur emissions but could also add to costs.

Coal, especially high-sulphur coal, is available in large quantities in close proximity to consuming markets, and many existing power plants can

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1/ National Research Council (NRC), Abatement of Sulfur Oxide Emissions From Stationary Combustion Sources", 1970, National Technical Information Service, PB 192887, February 15, 1970.

2/ National Air Pollution Control Administration (NAPCA), "Control Techniques for Sulfur Oxide Air Pollutants", Publications AP-52, Jan. 1969.

burn only coal. New coal burning plants could be built if air quality standards can be met. Process economics for coal desulphurization are marginal, and optimistic assessments of economics are generally based on a substantial credit for sale of byproduct sulphur, but the supply of sulphur has exceeded demand recently, and substantial additional production of elemental sulphur could cause further disruption of the domestic sulphur industry.

c. Production

(i) Underground Mining

The coal in the Rocky Mountain States that is too deeply buried to be extracted by surface mining would be recovered by underground mining. The selection of underground mining techniques would depend upon local geologic phenomena that might influence mining conditions. The type and extent of such phenomena would affect not only the economics of mining but would also affect severity of surface and subsurface environmental impacts. Because most of the coal resources in the Rocky Mountain States are on public, Indian, or State lands, environmental impacts can be minimized by effective enforcement of Federal and State operating regulations.

If the East Louisiana sale is not held and if the Rocky Mountain States should have to produce an equivalent amount of energy from coal (10-20.9 million short tons per year), the severe short-term environmental impacts of surface mining could be minimized by underground mining. The manpower requirements and capital expenditures, however, would be large.

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On the basis of an annual production rate of about 2 million short tons per underground mine, approximately 6-12 underground mines would be needed. Manpower for these operations would total from 3-6 thousand employees and capital expenditures would range from $144-288 million. 1/

Social costs in terms of health and safety of mine employees must be considered along with the capital expenditures and the environmental costs of underground coal mining. A total of 220 men were killed in 1970 in underground coal mining operations. On the basis of the 1970 injury frequency rate of 1.00 per million man hours continuing into the 1980's, about 6 additional fatalities could be expected annually from 1980-1985 at the underground mines developed to supply the same amount of energy as expected from the East Louisiana sale. 2/ This is in comparison with one additional fatality offshore which could be expected from the proposed sale.

Underground recovery of coal from beds less than ten feet thick averages about 57 percent 3/; however, as coal bed thickness increases above ten feet, the recovery percentage decreases drastically. This decrease is related to the equipment used underground, none of which has the capability of efficiently extracting coal from beds over ten feet in thick-

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1/ National Petroleum Council, Coal Task Group, "An Initial Appraisal, 1971-1985", U.S. Energy Outlook, Vol. II, 1971, p. 136.

2/ USDI, Bureau of Mines, Office of Accident Analysis, "Injury Experience and Worktime in the Minerals Industries: 1969-1970" (Mineral Industry Surveys, July 1971, p. 8.

3/ R. L. Lowrie, "Recovery Percentage of Bituminous Coal Deposits in the United States", USDI, Bureau of Mines, 1968, p. 11.

ness. Equipment manufacturers have not been interested because of a lack in demand in designing machinery specifically for mining thick beds. Furthermore, neither public nor private research organizations have investigated systems of underground mining to attain high rates of recovery from thick beds.

Exploration activity in the Rocky Mountain States has not been directed towards obtaining the data necessary to design efficient methods of underground mining in thick coal beds. Generally, exploration activities by industry have been directed toward development of near surface reserves for open pit mining. Numerous questions concerning local geologic phenomena and mining conditions remain to be answered about the deeper resources before large-scale underground mines could be efficiently operated at most places. Principal among these are: roof strata thickness, composition, and strength; coal bed continuity, quality and thickness; bottom strata thickness and composition; and the presence or absence of fault stems, aquifers, or explosive gas-bearing strata. In addition to affecting mine safety and production efficiency, these geologic phenomena and mining conditions could strongly influence the environmental impacts of large-scale underground mining.

Underground Mining Environmental Impacts

Subsidence of the ground surface is common above any abandoned and some active coal mines. The amount of subsidence relates to the mining method employed, the amount of coal removed, the thickness of the coal bed, and the composition and strength of rocks overlying

the coal. Subsidence of large areas commonly destroys man-made structures and disrupts the ground water hydrology, cuts off surface and subsurface water recharge, adversely affects the quality of underground and surface waters, redirects the planned drainage of a mine, disrupts surface drainage, and in periods of heavy rainfall localizes flooding. It also, in some localities, causes land slides, and minor earthquakes.

The most successful method of preventing or alleviating surface subsidence problems is to plan mining so that more pillars are left untouched. Unfortunately, this procedure results in less coal recovery. Much additional research is needed to develop methods of underground mining which will minimize subsidence of the surface. If such methods cannot be implemented, the best solutions may be to achieve as complete recovery of coal as possible during mining, then allow controlled subsidence to the point of natural stabilization and, finally, develop the land surface.

Ground and surface waters entering active underground mine workings are normally pumped to the surface for disposal. Because of the low-sulphur content of most Rocky Mountain coals, it is uncertain whether acid-mine water would be a problem in areas of large-scale mining and above average precipitation. If acid-mine water problems should develop, it is likely that the modern treatment methods employed in the coal fields of the eastern United States could be implemented to abate their impacts. The large volumes of sludge resulting from such treatment could be emplaced

either in abandoned mine workings or in protected surface mine workings or in protected surface mine waste disposal areas. Commonly, acid-mine water drains from abandoned mines and workings. This type of effluent discharge can be prevented by locating mine entries at elevations above the prevailing drainage level, by sealing abandoned mine entries, and by emplacing dams at critical points in abandoned underground entries and haulageways.

In most coal producing areas, mining and processing wastes contribute large volumes of sediment to nearby streams, are sources of acid drainage and, where waste piles are burning, are sources of air pollution.

The most commonly used technique of preventing widespread scattering of mining and processing wastes is to compact the waste in layers, followed by sealing with incombustible soil, after which vegetation is established to prevent infiltration of surface water and to minimize erosion.

An alternative to surface disposal of mine and coal processing waste is to return wastesto abandoned underground mine workings. This is currently being done to control surface subsidence in mined areas in compliance with restoration provisions of the Appalachian Regional Development Act of 1965, as amended. 1/ Methods of returning the waste to mined out areas concurrent with active mining would appear to warrant attention of mining method researchers.

1/ C. B. Kenahan and E. P. Flint, "Research and Programs on Recycling and Disposal of Minerals, Metal and Energy-Based Solid Wastes," USDI, Bureau of Mines, 1971, p. 24.

Dust from mine access roads, coal handling, and processing can be alleviated. Road dust can be minimized by hard surfacing, or through abatement techniques, such as oiling or chemical treatment of the road surface. Dust from coal handling and processing can be abated by spray treatment at transfer points and by enclosing coal handling and processing structures. Dusting problems in live coal storage piles can be reduced by water sprays or oiling; dead storage piles can be sealed with asphaltic or chemical materials.

The potential for long-term environmental impacts from an underground mine can be diminished by identifying and eliminating pollution sources prior to closure of the mine. Most pollution sources can be eliminated by sealing and revegetating waste disposal areas; sealing and removing abandoned mine buildings and structures; and scoring, fertilizing, and revegetating areas formerly occupied by buildings and structures, mine roads, and supply storage areas. Consideration should also be given to flushing all wastes and utilization plant refuse into underground mine voids to remove sources of surface pollutants and to reduce possible surface subsidence. Such flushing of all wastes could have either beneficial or detrimental effects on the ground water hydrology and surface drainage, depending upon local conditions.

A discussion of the favorable environmental effects of underground mining follows:

When subsidence of the land surface is prevented, the surface effects of underground mining generally are confined to the areas

occupied by mine buildings, dumps, waste disposal banks and impoundments, water supply impoundments or wells, coal transportation systems, power supply structures, and mine supply storage yards.

The areal extent of environmental impacts associated with underground mining is dependent on pre-planned mining systems designed to assure a high level of environmental quality during exploration, development, production and post-production operations. Means of obtaining this assurance are State and Federal regulations, and the development of an environmental ethic by all mine operators. The Mined Area Protection Act of 1971 (S. 993 and H.R. 5689) currently being considered by the 92nd Congress, is an example of pending legislation that would require all underground and surface operators to adhere to standards designed to protect the environment.

Several provisions of the mandatory safety standards issued under the Federal Coal Mine Health and Safety Act of 1969 have related environmental objectives, especially those standards for disposal of mine refuse and dust, for coal handling, and for transportation facilities.

Most older coal leases on Federal lands include a provision in the lease agreement for the protection of the land surface, natural resources, and improvements. This provision has been broadened over the years to include environmental considerations.

Underground mining is subject to minimal noises and vibrations and the surface environmental effects from drilling, blasting, and spills and

characteristics and amounts of impurities in the coal bed being mined, and the efficiency and type of coal processing equipment.

Uncontrolled disposal of coal mining and processing wastes, especially those containing carbon and trace amounts of sulphur, constitute a source of land, water, and air pollutants.

Water flowing over waste disposal areas commonly transports silt and leached minerals to adjacent land and surface water drainage areas. In addition, dust-size particles commonly are transported by winds to contaminate adjacent land and water resources. If a waste pile containing large amounts of carbon ignites, noxious gases entering the atmosphere are hazardous to plants, animals and people.1/

Waste disposal areas require a commitment of land resources. Furthermore, if poorly constructed and uncontrolled, these waste areas present an unattractive appearance to viewers.

Slides and slump failures commonly occur where waste is deposited on slopes and where an improper combination of moisture and clay minerals in the topsoil or in the waste act as lubricants. In such unstable conditions, large quantities of waste can move downslope and have adverse effects on land and water resources as well as being safety hazards to plants, animals, and people.

Should fine coal cleaning be included in the preparation processes for Rocky Mountain coals, the discarded fine waste would probably be deposited

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1/ L. M. McNay, "Coal Refuse Fires, An Environmental Hazard," USDI, Bureau of Mines, 1970, p. 8.

in slurry impoundments where the water would either be decanted for recycling to the preparation plant or allowed to evaporate. Poorly designed impoundment dikes in the past have permitted percolating leachate water to enter downslope surface water drainage areas.

In addition, construction of impoundments on underlying pervious bedrock commonly results in infiltration of the ground water table by mineralized water or in percolation of such water through the base of dikes to enter downstream surface water drainage systems where these types of leakage commonly affect aquatic plant and animal life and should not be permitted.

Unless measures are taken by coal operators to seal and revegetate both coarse and fine waste upon abandonment of waste disposal areas, many unfavorable impacts can continue for decades. However, use of appropriate treatment methods on the part of coal operators, coupled with effective enforcement of waste disposal regulations promulgated by State and Federal Governments, can minimize such effects on the environment. There also can be beneficial uses of waste materials.

The waste rock removed during mining is in many areas utilized as landfill to provide level sites in deeply dissected terrains. This type of landfill is an effective method for disposal of mine waste when properly compacted, sealed, fertilized, reseeded, and revegetated.

for approximately 200 million short tons of 35.2 percent of the 560 million short tons total U. S. production. 1/

It is estimated that for the year 1971, the amount of surface-mined coal will have increased to about 47 percent of total U.S. production.

The principal reasons for this growth are: (1) full production can be reached quickly, (2) the coal can be mined more cheaply, and (3) open pit mining is much safer than underground mining. As to safety, in 1969, there were 29 fatal and 942 non-fatal accidents attributed to open pit mining of bituminous coal and lignite. In 1971, there were 15 deaths and 81 injuries associated with offshore production on the Gulf of Mexico.

Similarly, in 1970, there were 31 fatal and 1,010 non-fatal accidents connected with open pit mining. During these same periods, however, underground mining was responsible for 155 fatal and 8,139 non-fatal accidents, and 219 fatal and 8,710 non-fatal accidents for 1969 and 1970, respectively. 2/

If the 11-22.5 million short tons of annual coal production required to replace the energy supplied by the East Louisiana sale, over a five-year period, should be furnished totally by surface mines, it is believed that from 3-5 mines of five million short tons annual

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1/ J. J. Gallagher and L. W. Westerstrom, "Coal-Bituminous and Lignite", Minerals Yearbook. Bureau of Mines, 1969, p. 309.

2/ Bureau of Mines, Office of Accident Analysis, op. cit., p. 7.

capacity each would be the appropriate number of operations needed. Currently, a mine of this magnitude employs 610 personnel with a capital expenditure of about $40,000,000. Therefore, in order for surface mines to supply the 10-20.9 million tons of coal needed annually, 1830-3,050 employees would be needed with a total capital expenditure of $120-200 million. 1/ This capital expenditure does not include the necessary financing for coal cleaning facilities.

(ii) Open pit mining---Environmental Impact

There generally are no favorable environmental effects to be found in the immediate area surrounding a surface coal mine. There are many serious environmental problems that are directly related to open pit mining. Principal among these are:

Open pit mining disturbs a considerable amount of surface acreage. As of 1967, it is reported that open pit coal mines were responsible for 41 percent of the land disturbed by surface mining in the United States. 2/

Predictions regarding the total size of the areas which would be disturbed by the surface mining of nearly 20,000,000 short tons of coal are shown in the following table:

1/ National Petroleum Council, 1971, op. cit., p. 41.

2/ USDI, Surface Mining and Our Environment, A Special Report to the Nation, 1967, pp. 53-54.

PRODUCTION BY SURFACE MINING METHODS

(BASED ON 1,800 TONS PER ACRE FEET)

(FIGURES BASED ON 20,000,000 TONS PRODUCTION ANNUALLY OVER 5-YEAR PERIOD)

Coal Bed Thickness (Feet)	Recovery Factor (%)	Coal Available Per Sq. Mile @ 80% Rec. (Tons)	Area Disturbed Annually (Sq. Miles)	Area Disturbed (1980-1985) (Sq. Miles)
10	80	9,216,000	2.3	11.5
15	80	13,824,000	1.5	7.5
20	80	18,432,000	1.1	5.5
25	80	23,040,000	0.9	4.5
30	80	27,648,000	0.8	4.0
35	80	32,256,000	0.7	3.5
40	80	36,064,000	0.6	3.0
45	80	41,472,000	0.5	2.5
50	80	46,080,000	0.5	2.5

Additional open pit mining of a 10 foot bed of coal, sufficient to satisfy the 100 million short ton energy requirement between 1980 and 1985 would necessitate the disturbance of 7,360 acres of land. Surface mine production from a 50-foot bed would disturb 1,600 acres. Regardless of whether the coal is produced from a 10 foot bed or beds up to 50 feet or more in thickness, rehabilitation of disturbed lands would be required, and speed in reclaiming and revegetating mined lands would be important in order to minimize environmental degradation.

The following table shows the rehabilitation cost on a per ton basis to whatever degree of restoration is desired:

ESTIMATED COSTS IN CENTS PER TON OF COAL FOR REGRADING, RESEEDING, AND REVEGETATING STRIP-MINED LANDS TO A PLEASING, NATURAL CONTOUR

Assumed tonnage of coal recovered per acre		Estimated costs of reclamation per acre (dollars)				
		$1,000	$2,000	$3,000	$4,000	$5,000
10,000	Cost Per Ton	.10	.20	.30	.40	.50
20,000		.05	.10	.15	.20	.25
30,000		.033	.066	.10	.13	.17
40,000		.025	.05	.075	.10	.13
50,000		.02	.04	.06	.08	.10
100,000		.01	.02	.03	.04	.05

Climatic conditions are extremely important in considering the rehabilitation reseeding, and revegetation of mined lands in the Rocky Mountain States. Obviously, without proper moisture, the reseeding of reclaimed lands would serve little purpose and erosion processes would soon destroy the contour of the rehabilitated lands.

Disruption of the land surface by open pit mining would, unless proper precautionary measures are implemented, have adverse impacts on all vegetation, forestry, grazing, crops, birds, land animals, endangered species, habitat, water supplies, and water quality, all of which would limit the enjoyment

vailing geologic, technologic, and economic restraints. In effect, the short-term economic and energy profits derived from surface mining should be compared with a possible long-term degradation of the environment. Such degradation can be prevented if there is complete cooperation between all companies, land owners, and governmental bodies acting in concert.

d. Transportation
(i) Systems

All new power plants could be situated at, or near, the actual mine locations, thereby having nominal effect upon existing coal transportation systems. The end product of the above plants (electricity) could be more readily transported to the market areas by transmission lines and existing or new underground pipelines. Transmission lines and pipelines should also cause fewer environmental problems than increasing the milage of highways or rail routes and building the vast number of highway trucks and hopper cars necessary to move this vast quantity of low-sulphur fuels.

Four systems of transporting coal would be available in the Rocky Mountain States for moving coal from a mine to a point of utilization. These systems would be: trucks, railroads, conveyors, and coal slurry pipelines. A fifth system, water transportation, may be discounted because of the lack of navigable waterways. Each system has advantages that would make it economically attractive for transporting coal to a point of utilization. Selection of a system would be strongly influenced by the distance to a utilization plant. Relative costs of coal transportation systems are given in an attached table.

scenic views, open space qualities, hunting, and fishing. Additionally, downstream areas far removed from the mine and processing plant could have their surface waters adversely affected as to quality and fish, fishing, and water recreation could be destroyed or restricted.

Surface mining is also a source of fairly significant volumes of noise and vibrations from blasting, drilling, heavy mining equipment, trucks and landslides. Modifications of the habitat, alteration of ground cover, alteration of drainage systems, destruction of land forms, and siltation of nearby streams are also fairly pronounced. Landslides do occur, and subsidence does not occur beyond that of fill compaction.

With the implementation of proper rehabilitation, reforestation, revegetation and other environmental safeguards, the unfavorable impacts described heretofore, can however, be reduced to short term problems.

Proper supervision within the scope of present environmental regulations would result in mined lands being returned to "as good or better than found conditions," in that some restored lands could lend themselves to recreational sites, lake impoundments for boating and fishing, picnic areas, and eventually could promote resort facilities.

The end use to which surface-mined lands can be reclaimed concurrent with mining is limited only by the capacities of men operating within pre-

vailing geologic, technologic, and economic restraints. In effect, the short-term economic and energy profits derived from surface mining should be compared with a possible long-term degradation of the environment. Such degradation can be prevented if there is complete cooperation between all companies, land owners, and governmental bodies acting in concert.

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Truck transportation is commonly used for relatively short hauls. Typicall truck transportation is used to supply mine-mouth utilization plants; the roads are usually less than 5 miles long, on land leased by the mining company and have little effect on the general public. In the Rocky Mountai States, there are usually no intersections with public roads and the traffi is generally related to the mining operations. Trucks can transport ash and spent utilization plant materials back to mine pits for disposal, there using the haul in both directions as well as solving a refuse disposal prob m.

DATA ON RELATIVE COST OF VARIOUS TRANSPORTATION SYSTEMS

	Transportation cost in mills per ton mile		
	Maddex 1/	Aude 2/	Wellman 3/
Ocean shipping	0.3-10		
Pipeline	1.5-10	3-7 (More than 50 miles no slurry preparation)	
River barge	2-4		
Railroad	4-15	4-9 (Unit train more than 400 miles)	
Truck	55-70	50-80 (One way haul with empty return)	
Conveyor belt		20-60 (Less than 15 miles)	
Pneumatic			130 (600 tons pe hour, 5 miles)

1/ Philip J. Maddex, and Ole Skaarup, "The Cost of Transporting Ores and Raw Materials in World Markets." Mining Engineering, June 1970, pp. 56-57.

2/ T. C. Aude, N. T. Couper, T. L. Thompson, and E. J. Wasp. "Slurry Piping Systems: Trends," Chemical Engineering, June 28, 1971, pp. 74-90.

3/ Paul Wellman and Sidney Katell. "Economic Evaluation of Pneumatic Transport of Coal at 200,400 and 600 Tons per Hour. Paper in Pneumatic Transportation of Solids, Proceedings: Institute of Gas Technology-Bureau of Mines Symposium, Morgantown, W. Va., October 19-20, 1965. Compiled by J. D. Spenser, T. J. Joyce and J. W. Faber, 1966, p. 184.

The impact of railroads varies to some degree with the type of motive power used. Diesel locomotives are sources of exhaust gas and noise pollution; electric locomotives are not sources of air pollution per se, however, the pollution source is the power station. Regardless of the type of locomotive power used, railroad installations offer means of transporting other commodities to fulfill the needs of inhabitants in areas adjacent to coal mines. Rail haulage can serve to transport ash and spent materials back to the mine pits for disposal, thereby utilizing the haul in both directions as well as possibly solving the refuse disposal problem.

Rail installations can be constructed to lessen the environmental impact of the installation on the environment. Ribbon rail with thermite welded joints can be installed to reduce track noise. Rights-of-way can be fenced, for safety to animals and humans, with underpasses and grade separations provided for heavily traveled roads. Coal hoppers can be partially covered, or the coal can be sprayed to reduce dust loss in transit. Coal loading and unloading facilities can be designed to consider aesthetics and should include dust suppression equipment. Cut and fill areas, often sources of silt from erosion, can be constructed with gentle slopes to permit the growth of erosion inhibiting vegetation and borrow areas can be covered with top soil set aside for this purpose, and then revegetated.

Overland conveyor systems are used to transport coal from mine to preparation plant, from truck or railroad unloading hoppers to storage areas or bunkers and directly to some utilization plants. Generally, these installations are short; however, locally they may be as long as 15 miles. Although conveyor structures and transfer point housings are obvious intrusions on open space vistas, this impact can be lessened through selective use of colors.

Rights-of-way for conveyor installations require less land than either truck or rail rights-of-way and do not require the extensive cuts and fills needed by other transport systems; however, any surface disturbances are subject to erosion if not properly revegetated.

The least obtrusive type of transportation system from both land use and visual standpoints are coal slurry pipelines. Land surface requirements are minimal because the pipeline is buried and appears at the surface only at drainage crossings, and pumping stations. Slurry preparation plants, pumping stations, and terminal coal dewatering and storage facilities are the only permanent structures. The pipeline, after installation, does not interfere with the free movement of vehicles, people, and animals. The only noise sources are at the slurry preparation plant and at pumping stations. Dust problems associated with pipelines are confined to the slurry preparation plant where the coal is crushed, screened and stored; however, dust suppression methods commonly employed in conventional coal preparation plants minimize this problem.

(ii) Environmental Impacts

The major adverse environmental impacts of alternative transportation systems are air and noise pollution, safety, the amount of land required for rights-of-way, trash disposal and aesthetics.

Air pollution sources are exhaust emissions, road dust, and coal dust. The level of adverse exhaust emissions can be reduced through efficient engine maintenance; road dust can be reduced by haul-road surface treatment such as hard surfacing, oiling, or applying water-chemical solutions; and coal dust can be reduced by truck covers and spraying. Although mufflers can reduce the level of noise pollution, truck haulage, because of the large number of noise sources and frequent trips, is commonly recognized as the noisiest system of transportation.

Collisions between trucks, other vehicles, and animals can occur but do not normally constitute a serious public hazard because haulage roads generally are confined to the mining and processing areas.

Land use committed to truck haulage is the largest of any of the coal transportation systems.

In the Rocky Mountain States, the presence and movement of large numbers of trucks in open areas may be aesthetically objectionable to the public, especially if the haulage roads are near public use areas.

Secondary environmental impacts from truck transportation arise from improper disposal of tires, expended oil, and used parts. These items

can be disposed of in open cuts of surface mines and then buried with reclaimed spoil and revegetated. In addition, special disposal pits can be excavated at underground mining operations where these items can be buried and the area revegetated. Depending on economics of the particular mining operation, a reasonable alternative would be to recycle these items.

Rail transportation systems using diesel locomotives are sources of air and noise pollutants from engine exhaust systems. Effective maintenance of engine combustion systems and efficient mufflers can reduce the air and noise pollution levels from these systems. Coal dust lost in transit can be reduced by using partially covered hoppers or by oiling the coal during loading. Dusting during loading and unloading can be reduced with a combination of dust suppression sprays and enclosed chutes or bins.

The right-of-way for a railroad constitutes a permanent commitment of the land surface to this use making it unavailable for other uses. Free travel of vehicles, people and animals across the committed area is restricted. The potential for collisions with trains exists.

In the open or scenic areas of the Rocky Mountain States, railroad rights-of-way may be considered as aesthetic intrusions, especially if large trestles, overpasses, or cut and fill areas are required. Cut and fill areas can be constructed with gentle slopes and revegetated, and borrow areas can be reclaimed as mentioned in conjunction with truck transportation systems. The visual impact of trestles, overpasses, and other appurtenant structures can be minimized with effective combinations of eye-pleasing designs and unobtrusive colors.

Conveyor system installations likewise constitute a permanent commitment of the land surface and restrict free movement of vehicles, people, and animals. The right-of-way width is less than that required for truck or railroad transportation systems. Uncovered or partly covered conveyors allow loss of dust in transit because of exposure to winds. Uncovered transfer points also are a potential source of dust when suppression devices are not provided. Open, or partly covered conveyors, constitute a safety hazard to persons or animals when a support structure is installed close to the ground. Conveyor systems can be fenced or completely enclosed to eliminate dusting and safety hazards to humans and animals.

Conveyor support structures, either frame or suspension type, as well as the conveyors, are obvious visual intrusions, especially at points where the conveyor crosses deep drainage systems. Color treatment of support structures, enclosures, and transfer structures would lessen this impact.

The principal impacts of coal slurry pipeline systems are: the permanent commitment of land; providing an adequate water supply; and water disposal. Large quantities of water, at the rate of one ton of water per ton of coal, are required to transport coal in the Black Mesa, Arizona, Pipeline 1/ (Arnold, 1979, p.8). In water deficient areas, this method may not be an efficient transportation alternative, particularly where the water must be supplied by deep wells which, when pumped, could have a draw-down effect on shallower wells that supply people or livestock. Additionally, water disposal problems at the terminus of a pipeline could have an impact on water quality if not properly contained or when not

1/ J. M. Arnold, "Discovery and Development of Peabody Coal Company's Black Mesa Mine," Society of Mining Engineers and American Institute of Mining and Metallurgical Engineers, Preprint No. 69-F-349, 1969, pg. 8.

economically feasible to recycle the water for transportation purposes. Coal slurry destined for power, could be dewatered, the "spent" water used for cooling tower makeup, ash handling, and/or evaporated in disposal ponds. The Mohave generating station in Nevada is utilizing water from the Black Mesa Pipeline in this manner.

The disposal of solids and water removed from sections of a plugged pipeline could cause environmental impacts. Holding ponds, equal in capacity to the upstream pipeline, could be provided at pumping stations and at the coal slurry preparation plant for disposal of removed plugs. The water could be evaporated and the coal could be left in the impoundment unless provisions are made for recovery. Compaction and sealing would prevent spontaneous ignition, erosion, and accompanying siltation of the coal left in impoundments. The surface of the impoundment can then be revegetated with indigenous plants to inhibit erosion of the seal.

Waste Disposal

Large volumes of waste are generated during coal mining and processing. The volume of mine waste depends on the type and characteristics of top and bottom strata, the continuity of a coal bed, the existence of fault zones, and the tonnage of country rock that must be mined. The type and volume of waste discarded during coal processing, depends upon the specifications for which the coal is being prepare,

5. Increase Hydroelectric Power

The generating potential of any hydroelectric site is a function of both stream discharge and the height of fall, hence the better hydroelectric sites are concentrated in areas with heavy precipitation and large topographic relief. The following table shows the extent of U.S. potential and development water-power capacity:*

Geographic Region	Potential Power (10^3 MW)**	Percent of Total	Developed Capacity (10^3 MW)	Percent Developed
New England	4.8	2.7	1.5	31.3
Middle Atlantic	8.7	4.8	4.2	48.3
East North Central	2.5	1.4	0.9	36.0
West North Central	7.1	3.9	2.7	38.0
South Atlantic	14.8	8.2	5.3	35.8
East South Central	9.0	5.0	5.2	57.8
West South Central	5.2	2.9	1.9	36.5
Mountain	32.9	18.3	6.2	18.8
Pacific	62.2	34.6	23.9	38.4
Alaska	32.6	18.1	.1	0.3
Hawaii	0.1	0.1	-	-
Total	179.9	100.0	51.9	28.8

Of the potential hydroelectric capacity of 179,900 MW in the U.S., 95,400 MW is yet to be developed in the lower 48 States, with 65,000 MW concentrated in the Mountain and Pacific Regions. Thus 30,400 MW is the potential for additional hydropower in the East. Hydropower from Alaska, the Pacific or Mountain areas of the U.S. probably can not be considered as sources of

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* Statistics as of January 1971 obtained informally from FPC

** MW = Megawatts

additional hydropower for the Eastern U.S. largely because the distance from consuming region and the related transmission problems would make the construction of transmission lines economically infeasible.

The Federal Power Commission projects electric generating capacity in the U.S. as follows:

Year	Total Generating Capacity (MW)	Total Hydro Capacity (MW)	Hydro as Percent of Total
1970	340,058	51,641	15.2
1980	665,000	68,000	10.2
1990	1,260,000	82,000	6.5

The breakdown of the projected 16,400 MW increase in hydro capacity in 1980 over the 1970 capacity for the U.S., assuming the 1970 distribution of development, would be as follows:

Geographic Region	Incremental Hydro Capacity (MW)
New England	475
Mid Atlantic	1,328
East North Central	279
West North Central	853
South Atlantic	1,673
East South Central	1,640
West South Central	607
Mountain	1,952
Pacific	7,560
Alaska	33
Hawaii	--
Total	16,400

leaks are of limited significance. Modifications of the habitat, alteration of ground cover, alteration of surface drainage systems and the necessity of fertilization application are also minor. The following environmental effects of underground mining are however, one which pose certain problems: alteration of ground water hydrology, the necessity of well drilling and fluid removal, the techniques of product processing and resultant waste, liquid effluent discharges and most accidents.

Many unfavorable environmental impacts of underground coal mining can be controlled largely through techniques developed and used in recent years. Prevention of environmental degradation by underground mining is dependent upon attitudes of mine operators and efficient enforcement of local, State or Federal regulations.

(ii) Open Pit Mining

Near surface coal (0 to 200 feet) generally can be extracted by open pit or surface mining. This method involves the removal of the top soil and rock (overburden) to expose the coal bed, removal of the coal, and replacement of the spoil material and, in some instances, replacement of the top soil. Usually this is accomplished by working in large parallel trenches using the overburden of the second trench, or cut, to fill the first trench.

Surface or open-pit mining of coal has become a major source of solid fuels and, unless restrained by environmental restrictions, all evidence indicates that this method will increase in importance. For example, in 1929, open pit coal production amounted to three percent of the total United States production. 1/ In 1969, however, open pit mining accounted

1/ F. E. Cash and Bernewitz, "Methods, Costs and Safety in Stripping and Mining Coal, Copper Ore, Iron Ore, Bauxite, and Pebble. "Phosphate", USDI, Bureau of Mines, Bulletin 298, 1929, pg. 9.

Of the total incremental hydroelectric capacity of 16,400 MW, 6,855 MW can be expected to come from areas other than the Mountain, Pacific, Alaska and Hawaii areas.

OCS oil and gas produced from the proposed East Louisiana General Sale, and the projected incremental hydropower expected to serve areas of the lower 48 States other than the Mountain and Pacific Areas have been converted to Btu's for comparison.

	Expected Quantity	BTU's Day
OCS Oil	75-150,000 B/D	$435\text{-}870 \times 10^9$
OCS Gas	200-400,000 MCF/D	$206\text{-}413 \times 10^9$
Hydropower	6,855 MW	256×10^9

The potential of hydroelectric power is limited. Of the 95,400 MW yet to be developed in the lower 48 States, 31,400 is likely to be developed by 1990 under existing programs. To equal the energy available from the East Louisiana OCS oil and gas lease sale, hydropower in the Eastern and Central U. S. would have to be increased by 14,800-29,600 MW. The latter figure is far greater than the total potential of 23,500 MW of additional hydropower in these areas so, even if all of this remaining potential were developed, and it was fully substitutable for oil and gas uses, it could serve only as a partial alternative to the oil and gas that would be produced as a result of the proposed East Louisiana OCS sale. There also are factors of reliability as a source of energy to meet base or peak requirements because of the seasonality of the energy form and the fact that few dams are built solely for hydroelectric power generation. Irrigation, navigation, municipal, industrial uses, and flood control

are important, and frequently are the dominant uses which may not be fully compatible with power production needs.

a. Environmental Impact of the Alternative

Numerous environmental impact statements filed by the Bureau of Reclamation of the Department of the Interior and by the Corps of Engineers describe environmental impacts of specific hydroelectric projects.

Favorable

Hydroelectric power produces no air pollution, radioactivity, waste heat, nor water pollution (with the exception of the loss of oxygen content in storage facilities). Dams valuable for hydroelectric purposes may be otherwise useful for such needs as irrigation and flood control. Lakes behind dams created for hydroelectric purposes provide recreational opportunities such as swimming, fishing and boating.

Unfavorable

Construction of a hydroelectric dam represents an irretrievable commitment of the land resources beneath the dam and lake, precluding other uses, (agriculture, minerals, wildlife habitat, free-flowing river recreation, and so forth). Alteration of river flows may lead to silting behind the dam, thus progressively reducing reservoir capacity and its effective use and finally, after many years, filling the lake. Alteration of downstream flows from power-plant discharges can cause scouring of banks and bottoms.

Fish and wildlife habitat may be significantly changed. The reproductive habitats of anadromous fish may be severely altered by dam construction, unless elaborate provision is made for fish ladders or other means to provide safe fish passage.

6. Modification of FPC Natural Gas Pricing

This alternative appearing in the draft environmental impact statement has been commented upon formally by the staff of the Federal Power Commission (FPC) and those comments have been incorporated herein to the extent possible. The FPC staff has also provided informal assistance and consultation in our consideration of this alternative as presented in our draft environmental impact statement.

This alternative is an action that could assist in improving the investment climate which could attract risk capital to domestic oil and gas ventures in both domestic onshore and offshore areas. The direct environmental impact would be reflected in increased activities in those areas. For some applications, such as transportation, gas is not directly substitutable for oil. Conversion of vehicles to burn liquefied or compressed gas, and liquefaction of the gas, while possible, is not expected to be a realistic alternative to the use of refined petroleum products in this decade. Some other areas in which gas is not directly substitutable for oil are in plastics, lubrication, paint, synthetic fibers and petrochemical industries.

The FPC rate ceilings have been raised by 35% or more during 1968-70. Some of the recent major programs initiated by FPC to provide incentives to stimulate natural gas supplies are described below.

The Federal Power Commission, on July 16, 1971, in its Opinion No. 598, in a major step to deal with the critical shortage of gas in the United States, set new, higher ceiling rates for the South Louisiana area and provided for a system of incentives to promote dedication of gas reserves to the interstate market.

The Commission said that the evidence supports the conclusion that there is, "a worsening gap between supply and demand, and that price must have a major responsibility for eliciting new supplies." Demand for gas as a "pollution-free fuel" is increasing and the price of alternative fuels is going up, the FPC pointed out.

The Commission said its rate for new gas in South Louisiana is consistent with nationwide costs. It said it was mindful of the importance of South Louisiana as a source of new gas supplies both in terms of future production and potential for discovery.

In futherance of the concept of providing incentives, the Federal Power Commission has recently, on April 6, 1972, instituted a proposed rulemaking and statement of policy relating to an optional procedure for certificating new producer sales of natural gas. This is intended to provide an alternate method to stimulate and accelerate domestic exploration and development of the nation's natural gas reserves. The proposed alternate procedures are designed to assure interstate gas consumers, and the nation as a whole, an adequate and reliable supply of natural gas at the lowest reasonable cost and will be available only to producers bringing new supplies

of natural gas to the interstate market. This proposed new section of the Commission's Rules is not intended to replace geographical area pricing, but rather will provide, if approved, an alternative procedure for certification of natural gas sales for new gas sales at rates above established area ceilings.

As yet there are no significant indications that these price increases have resulted in additional exploration and development of natural gas resources above the levels experienced before the price increases. One example, that of the Ohio intrastate market, was cited in the Trans-Alaska Pipeline Statement 1/ as increasing its reserve additions 73% after a 14¢ per mcf increase in wellhead price. Only if extremely tenuous assumptions are made, can this example be used to infer what the national increase in supply would be. Thus, while it can be assumed that an increased supply would be forthcoming, the exact relationship between increased prices and increased supply is currently unknown.

While there seems to be consensus that increased prices could provide the necessary incentives to accelerate the exploration and development of additional resources, it is not now possible to project price/production relationships. However, based upon currently available information, it seems that significant price increases probably would be required. These in turn, would impose considerable cost increases on the consumers.

Because of the uncertainties surrounding the stimulation of substantial additional production through increased price, and the limited substituton possibilities, it is felt that as increase in natural gas prices could

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1/ TAPS, Volume III, page VI-36.

be considered as only a partial alternative to offset oil and gas supplies that would be provided from the proposed East Louisiana OCS sale.

a. Description of the Alternative

In 1954, the Supreme Court ruled that independent producers of natural gas, whose sale of gas goes into interstate commerce, were not exempted from regulation under the Natural Gas Act. Since then, the sale, including pricing, of gas destined for interstate markets has been subject to Federal regulations, as administered by the Federal Power Commission (FPC).

The FPC changed its method of price regulation in 1960 from an individual company "cost-of-service" method to an "area rate" concept which was upheld by the Supreme Court. The area rate method involves the accumulation of data sufficient to determine the average unit costs associated with all aspects of natural gas production on an areal basis, instead of examining the costs of each producing company. A listing of specific environmental impacts is not included in this section because any results of the proposed alternative can be directly attributed to other alternatives. Discussions of the environmental impact of increased production from onshore and offshore areas are applicable to this proposed action.

b. Possible Impact of the Proposed Alternative

Favorable. Higher allowed gas prices established by FPC policy or resulting from legislation to deregulate gas producers might stimulate

additional exploration and development of gas resources, but the reserve additions flowing from this action would be limited by the potential reserves in onshore and offshore areas subject to leasing. Since natural gas is by far the least polluting of the fossil fuels at the point of combustion and use, the availability of additional supplies of gas on a timely basis would benefit the environment. To the extent onshore gas production in the lower 48 States would be increased, it would reduce the need for gas from other sources including the OCS. Environmental problems relating to gas supplies from some sources such as synthetic gas, are greater than those associated with conventional production.

Unfavorable. Many of the remaining areas thought to have significant gas potential are offshore, so that additional production of gas in meaningful quantities would give rise to environmental problems essentially like those of OCS leases.

Increased gas prices would raise the cost of gas to the consumer. The extent of additional supplies of gas generated by increased prices would depend on the extent of the increase, on the progress of gas exploration, and on the limited potential onshore reserves. In recent years, neither interstate nor intrastate pipelines have attached adequate reserves to meet the growing needs of both markets and the high prices paid in some intrastate contracts for gas suggest that substantial interstate price increases would be required to divert gas from the intrastate market to the interstate market.

Higher gas prices might cause consumers to prefer other energy forms which produce more pollution at point of combustion. In terms of cost to the consumer of meeting his energy needs, neither increased use of natural gas at considerably higher cost nor increased use of electricity for heating purposes would be competitive with "dirtier" forms of energy.

7. Modification of Market-Demand Prorationing Systems

This section has been forwarded to the Louisiana Department of Conservation and the State of Texas for their review and comment. Extensive comments have been received from the Louisiana Department of Conservation and informal discussions have been held between Interior staff and the Commissioner of the Louisiana Department of Conservation.

Market-demand prorationing is a method used by some producing States to preserve a prescribed relationship between the amount of crude oil produced in a given period and an estimated "market demand" for that period. As currently used, allowable production for each well is determined each month by a State regulatory agency.

The stated purpose of prorationing is to prevent waste resulting from production in excess of demand for oil, maximum efficient recovery rate (MER), demand for gas, or ability to dispose of associated salt water. In practice, prorationing also serves to keep supply and demand at levels roughly sufficient to maintain prices at current levels.

In the late twenties and early thirties, the State laws were ineffective in keeping oil in excess of allowables ("hot oil") from the large fields out of interstate commerce. Accordingly Congress in 1935 passed the Connally Hot Oil Act to prohibit interstate shipment of any oil produced in violation of any State law--thus in effect prohibiting interstate shipment of oil in excess of State allowable production, sanctioning the practice of prorationing, and giving some conformity to both volumes of

production allowed and enforcement of uniform State practice. An Interstate Oil Compact Commission composed of State Governors and other representatives has effectively met these objectives and since 1965, Federal enforcement of the Connally Act has been curtailed.

In as much as prorationing is currently a State function which, based on State estimates discussed herein, is highly likely to become nonfunctional in the near future, there is little incentive for the States to rescind their laws unilaterally. Negotiation with the States, repeal of the Connally Hot Oil Act, or attack on the prorationing system in the courts through antitrust suits could lead to litigation and considerable delay in implementing this change.

Projections by the Office of Oil and Gas, and industry, suggest that the increase in demand under current conditions will be such that prorationing will cease to function in fact by 1974 even without any State or Federal Government action. The Commissioner of the Louisiana Department of Conservation has stated publicly that market demand proration has already ceased to function in his State. In that case, its elimination would not be an alternative for the period of interest to the proposed East Louisiana OCS lease sale since such production would begin subsequent to that time.

a. Description of the Alternative

As previously stated the purpose of prorationing is to prevent waste resulting from production in excess of demand for oil, maximum efficient recovery rate (MER), demand for gas, or ability to dispose of associated salt water. Removal of restrictions undoubtedly would result

in some increased domestic production of crude oil and natural gas. The time required to achieve an increase in producing rates and the magnitude of the increase is questionable.

Market-demand prorationing has already been eliminated on Federal OCS leasing by Presidential Order. To eliminate State market-demand prorationing would probably require: (1) voluntary State recision of their laws, and/or (2) repeal of the Connally Hot Oil Act, possible coupled wit a subsequent attack on prorationing under antitrust laws, (3) negotiation with the States to permit production at MER, with the Federal Government reducing imports by a like amount, or (4) allowing increased imports, thus forcing prices down and requiring optimum production from the most efficient fields. This last option would drive from the market any inefficient or marginal production which could not meet price competition

Elimination of State prorationing could result in some additional crude oil and natural gas being made available with little additional adverse impact on the environment. Minor increases in land and surface water pollution would be expected with possible increased flaring of noncommercial gases and increases in small spills, ruptures, or leaks in field lines or storage systems.

Most excess capacity is in a few major fields where facilities may have to be expanded to handle increased production. Production increases could be limited in the early phase by inability to process produced salt water and natural gas.

Productive capacity never remains constant; there is a need for continuous reappraisals. In addition, the conditions considered in estimating productive capacity are not uniform.

Only Texas and Louisiana, of the States with market demand prorationing, have excess productive capacity. Three States: New Mexico, Kansas, and Oklahoma, are producing essentially at 100 percent of maximum efficient rate (MER) and have been for some time. 1/

Actions taken recently by the State of Louisiana indicate that market demand prorationing may have already been abandoned due to the very strong demand situation for oil. Based on an indepth study made of the depth bracket allowable, the Commissioner of Conservation promulgated a new allowable schedule which increased the allowables for producing wells, particularly those completed in deeper horizons. The total allowable figure was also raised from 40 percent to a current allowable of 75 percent. On February 11, 1972, the Commissioner held a statewide allowable hearing and announced his findings that the 75 percent allowable for the great majority of the fields and reservoirs in the State was the maximum point at which they could be produced without creating waste and injury to the reservoirs themselves. The five major producing companies of the State were invited to give testimony that specific reservoirs could be efficiently produced at higher rates than the 75% allowable figure. These

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1/ Richard C. Byrd, General Counsel, Interstate Oil Compact Commission, Hearings--Subcommittee on Mines and Mining of the Committee on Interior and Insular Affairs. House of Representatives, 91st Congress, 2nd Ses. on Oil Import Controls, March-April 1970, p. 490.

conferences produced definite information that such reservoirs simply do not exist to any appreciable degree, probably to the extent of from 50 to 75 thousand additional barrels at unrestricted rates.

Texas has the majority of the excess producing capacity in the lower 48 States. Significant volumes exist in a limited number of fields, however there are disagreements as to how much the output of crude oil could be increased because of waste and pollution restrictions. Texas has recentl announced setting its April, 1972, allowable at 100 percent. The State estimates, however, that output will climb by only 150,000 to 200,000 barrels per day. They note this will barely fill requests for Texas oil by crude purchasers who have asked for 152,754 barrels of oil per day mor in April than they requested in March.

b. Environmental Impact

The impact of increased production on the environment that could result from removal of proration restrictions is dependent upon the exces production that would become available and the facilities that are availale to produce, process, transport, store and dispose of wastes resulting fro additional production.

Favorable

Limited increased quantities of both oil and natural gas would be produce to meet fuel requirements and the availability of natural gas with its clean burning characteristics could aid in improving air quality.

With adequate facilities to handle excess production from a given reservoir, additional supplies of crude oil would be produced with a negligible environmental impact in addition to that already existing.

Unfavorable

If facilities are not available to handle increased production there will be adverse impacts on the environment. Overloading established systems could result in environmental damage where little exists. As pump pressures are increased to process increased fluids, the number of oil spills, ruptures or leaks would be expected to increase with resulting damage to land and water resources. Problems associated with disposal of salt water would increase with increased possibilities of pollution to land, surface water and vegetation if the disposal system is unable to operate at increased rates. Efforts to increase water injection in disposal wells could result in casing or formation failures and damage to ground water resources.

With excess capacities limited to a few fields, existing surface and disposal facilities may not handle additional production, particularly in offshore areas. Production platforms may not permit additional equipment. Adequate treating of separated water on offshore platforms could be a major problem which could limit production increases. Expanded activities related to producing, processing, storing and transporting of crude oil and natural gas would increase the need for additional facilities each with their own environmental implications.

Construction and drilling activities associated with the expansion of facilities to adequately process increased production will have an impact on land surface use, surface water and possible ground water resources. The impact should be temporary and limited.

Elimination of market demand proration could have a local adverse impac on development of petroleum resources. Increased production in area markets could displace production from marginal stripper wells, many of which are produced by small operators. Loss of income from these operations would force premature abandonment of wells with resulting loss of petroleum supplies and reduced employment and economic activity in stripper well areas. This is not expected to be a major factor but could be in some areas.

8. Oil Shale Production

a. Description of the Alternative

Large areas of the United States are known to contain oil shale deposits but those in the States of Colorado, Utah and Wyoming are of greatest potential for commercial shale-oil production. It is estimated that some 73 percent of oil shale lands containing nearly 80 percent of the shale oil is Federally owned. The highest grade deposits occur over an area of 17,000 square miles (11 million acres) and contain an estimated 600 billion barrels of oil. Recovery of even a major portion of this potential could provide a liquid petroleum source that would meet part or all of future demand.

Three or more retorting processes have been developed to the point of technological practicability, but none has been demonstrated and tested at a commercial production scale. The mining of the shale presents no particularly difficult technological problems as it can be done by conventional room and pillar underground mining or by surface mining techniques. The major process barriers to development of this alternative therefore are the need for full-scale demonstration and testing to prove the technology and develop necessary cost and other data for determining economic feasibility. The President's Clean Energy Message of June 4, 1971, included provision for a program for orderly development of oil shale resources. The Department of the Interior

currently is considering the offering of up to six developmental leases (2 in each of the above states) as an initial step in implementation of the President's proposal. Since the present plan depends primarily on the industry as to the timing of commercial production, it is not possible to determine if significant production from this source could be expected by 1980. Furthermore, the development leases will provide the means whereby potential adverse environmental impacts can be detected and corrected before large scale production is undertaken. To the extent that major problems are encountered, delay could be expected. It would be possible to accelerate the rate at which the necessary research, development and demonstration is accomplished by an accelerated direct Federal program or by some types of incentives or subsidies for the private sector effort. Substantial production probably could be achieved by the 1980-1985 period and to a limited extent might provide an alternative to the proposed lease sale. However, since development is now only in the pilot plant stage, oil shale probably will not be available in significant quantities before 1980 due to a combination of economic, technical and environmental reasons.

The following section discusses the mining, processing and other activities that would be associated with an assumed full-scale oil shale development in the States of Wyoming, Utah and Colorado. The potential environmental impacts are set forth, to the extent of current knowledge, within each section but with the recognition that additional research, development and actual demonstration will be required before more precise environmental impact and necessary corrective or control actions can be fully identified and evalua

b. Production from Oil Shale Deposits

(i) Subsurface Mining

Using the room-and-pillar method of underground mining, a maximum of 75% of the shale could be removed. The remainder would be left as pillars to prevent surface subsidence. The ore would be raised to the surface and subsequently transported to the retort by truck or continuous conveyor belt. Oil production/mined shale volume relationships are shown in Table B-1.

Underground mining presents several advantages over open pit mining. First, only 2,000 acres of surface area over a 20-year period would be affected by an underground operation for a 50,000 barrels per day plant, as compared to ,000 acres in an open pit development. Up to 70% of the waste material can e returned to the vacant mine for disposal. Surface restoration needs would e minimal except around shaft openings and retort facilities. Wildlife and esthetic values would be less disturbed under this type of operation.

hile this type of mining, with most of its operations underground, requires ess surface acres, the disposal of spent shale also must be considered. wo methods are available for waste shale disposal· (1) total surface dis- osal, or (2) a combination of surface disposal and return of the waste to he underground voids left by mining.

otal surface disposal would require the same amount of land as needed for pen pit mining (56 to 80 acres per year). This acreage requirement could e significantly reduced by disposal of the waste material in the mine.

Table B-1 - Volume of shale in place and after mining and retorting for various shale-oil production rates.

Shale oil production, barrels per day	Shale mined, million ton per year	Volume of shale, billion cu. ft. per year	
		in place	After mining and retorting 1/
50,000	27	0.4	0.6 - 0.7
150,000	82	1.2	1.7 - 2.1
550,000	301	4.5	6.0 - 7.5
1,000,000	550	8.2	11.0 -13.7

1/ Dependent upon size of material discharged from retorting system.

Processed spent shale, however, has a lower density than the original raw shale and occupies a greater volume than the original rock in place. Therefore, only part of the waste could be returned to the mine (50 to 70%).

During the initial operation, while the underground mine is being developed, all waste would temporarily be stored above ground until sufficient mined-out space for disposal was available. For the 3-year period needed to reach full capacity, the required surface disposal area would approximate a total of 96 acres.

Spent shale disposed of in underground mines could be subject to leaching if the mine workings were flooded while active or became saturated after mining operations ceased. Environmental controls such as sealing off aquifers with concrete have been adequate in similar operations.

Since up to 70% of the waste could eventually be returned to the mine, dust problems from surface piles would be minimized. The shale crushing operation would require enclosed crushing and conveyor facilities, wherever possible, and protection of the piles of crushed shale from wind erosion.

The disturbance of underground waters by mining operations, or by waste used to return spent shale underground for disposal, could have an adverse effect on subsurface water quality. Because hydrologic data of much of the region are incomplete, the extent of this impact cannot be predicted at this time. Specific information developed during core drilling would reduce the risk of leasing areas where unavoidable adverse

impacts on aquifers are likely to occur. Close monitoring of the quality of underground waters, and the prompt action required under the proposed program to change hazardous operations, would mitigate any adverse effects.

(ii) Surface Mine Development

This type of mining involves removal and disposal of the overburden to expose the oil shale for extraction. The quantity of overburden material significantly affects the economics and time-span involved in reaching production. Current surface mining techniques, using existing large-scale equipment, could be expected to permit mine development at relatively low costs, although costs for environmentally adequate waste disposal and land restoration may be greater than costs for underground operations.

Where surface mining is practical, it offers the advantages of greater recovery of the resource, more efficient operations and lower unit costs, less hazardous working environment than underground mining, avoidance of subsequent subsidence problems, and the opportunity to design the resulting land surface for improved productivity and land use.

Surface mining presents significant potential environmental problems. Land required for actual mining activity for a 50,000 barrels per day operation would directly involve from 200 to 250 acres per year, or 4,000 to 5,000 acres over a 20-year life of an operation. This amounts to 16,000 to 20,000 acres to achieve 200,000 barrels per day (the approximate amount needed to replace oil and gas produced from the East Louisiana sale) over a 20-year span.

During early years of surface mine development, overburden disposal would be off-site, probably in a temporary disposal area. After six or more years, it would be possible to begin disposing of overburden in the pit as a part of the overall reclamation process.

Such surface mine operation of 25 gallon/ton oil shale at a 50,000 bbl/day plant capacity would require temporary off-site storage of up to 150 million cubic yards of overburden before pit return could begin. However, by properly selecting the disposal site and applying contouring techniques to control surface drainage, the area of land affected could be restricted to 400 acres and serious environmental impacts avoided.

The processed spent shale must initially be stored in an area away from the mine site. Return of the stored processed spent shale to the pit could begin after pit development is completed (about 6 years). Some 100 acres of land surface would be required for temporary storage space.

During any open-pit mining operation, the topography will be altered and the environment will be changed. The actual area affected will be determined by the thickness of the overburden and oil shale, the mining plan, and the rate of development. Up to 5,000 acres could be involved, and this would be increased about one-third if waste material is not returned to the pit. In the long-term, open pits refilled with processed spent shale and overburden could be revegetated, used by wildlife and domestic grazing animals and would return to a condition generally equal to and in some instances better than originally existed.

Waste disposal areas on flat land would create new "hills", which could be contoured and revegetated to prevent erosion and mitigate aesthetic degradation. Canyon and gully disposal areas would gradually be converted into flatter areas, and also revegetated.

Restoration operations would include contouring to blend with surroundings; construction of conduits, retaining dikes and terraces to prevent erosion, control surface run-off, prevent downstream contamination, and provide paths for normal water flow; protection of any natural streams; and revegetation.

Revegetation would be an integral part of watershed protection measures. It has been experimentally demonstrated that vegetation can be grown on processed oil shale with adequate reseeding, fertilization, and watering. A longer range vegetation goal would be the re-establishment of the natural plant community, or suitable replacement, to serve as wildlife food and cover. However, a significant amount of research experience indicates that re-establishment of the fuller range of native browse and cover species would be difficult.

Certain areas of the oil shale region provide a habitat with an attractive combination of vegetative, climatic, physiographic, and cultural conditions for nearly 300 species of wildlife. Fishery habitat is limited and inhabited principally by non-game fish populations.

Probable and potential impacts on wildlife and fish are of two general types: localized impacts at and in the vicinity of the actual oil shale operations: and impacts resulting from ancillary urbanization and human pressures.

Construction mining operations and servicing of oil shale plants would have direct and indirect impacts upon the normal behavior and activity patterns of wildlife in their vicinity. The impacts would be localized and include such things as: Reduction of food and cover through removal of overburden and surface vegetation for facilities, roads, etc; and alteration of wildlife behavior and activity patterns due to disturbance from equipment, facilities, traffic and noise of mining and industrial operations.

Aquatic habitat is very small in the oil shale areas. However, were an oil shale operation established within the vicinity of such habitat, and if unpredicted or uncontrollable changes in the quality of local surface or groundwater were to occur, there could be impacts on fish and wildlife populations. Additionally, if use of ground water for development and operation caused a lowering of natural ground water discharges, such as springs and seeps, potential adverse impacts would occur upon associated ecological features. Supplemental habitat water development programs such as wells and reservoirs may be required.

Certain species, such as mountain lion, bear, elk, and mule deer are by nature incapable of adjusting to the aggregate of human activities in a developing area (i.e., urban expansion, waste disposal, additional recreation use, etc.). Although populations of these species in the oil shale areas would be expected to decline over time, as a result of oil shale production population pressures, they should not decrease to the extent that the species would become rare, endangered or extinct. Added hunting and angling pressures indirectly resulting from improved access and increased local population could reduce hunting and angling

quality for some species and in local situations where there is reduced animal population and/or increased hunting pressure.

Where parts of the oil shale areas are now used for livestock grazing, agriculture, or recreation, some unavoidable changes in use patterns would result.

Development of public oil-shale lands would have little direct impact on agricultural activities, since most agricultural lands are privately owned. Some impact could occur if oil shale activities jeopardized water resources traditionally used for irrigation purposes.

(iii) In-Situ Developmen

An alternate processing technique would involve the recovery of oil from the shale by heating underground, in place. This technique is called in-situ processing and has not been successfully developed or demonstrated on a large scale, although considerable laboratory and field research has been carried out by government and industry.

Presently proposed heat sources for in situ recovery include underground combustion, hot natural gas, hot carbon dioxide, superheated steam, hot solvents, and combinations of two or more of these. It is anticipated that conduits for introducing heat underground would be provided by wells, mine shafts and tunnels, fractures created by a variety of techniques, or by a combination of these.

Surface operations for in situ recovery would be relatively simple, with the absence of problems associated with mining and spent shale disposal.

Disturbance of the original land surface and vegetation would be expected to be slight. Earth moving would be limited mostly to grading for well locations, plant site, and field roads. It is anticipated that less than ten percent of the land surface over an in situ recovery project would be affected at any one time.

The contamination of underground water could pose a problem, especially radioactive contamination if a nuclear device were used. All presently contemplated techniques for such in situ operations involve establishing permeability by fracturing which could change the existing hydrology, thus introducing problems. For this reason, only limited in situ operations would be permitted initially, and these would be closely monitored to prevent environmental degradation. Prior to authorization of commercial in situ processing, adequate control methods would have to be proven.

c. Processing Oil Shale into Oil

Oil shale processing on the surface would require the handling of large amounts of materials. The amount of oil shale needed to support oil shale production at rates up to one million barrels per day, and the volume of both the shale in place and after mining and retorting is detailed in Table B-1.

A number of retorting processes have been patented worldwide for the production of oil from oil shale. Three processes that have been tested using large experimental equipment appear at this time to offer reasonable possibilities of technical and economic success if scaled up to commercial design size. (Gas-Combustion process developed by the Bureau

of Mines, the TOSCO II process of the Oil Shale Corporation, and the Union Oil Company process.) In each system, heat is applied to raise the temperature of crushed oil shale to about 900° F., where the solid organic material (Kerogen) is converted to a liquid. The equipment, method of heat application, and operating procedures differ markedly for each system.

Oils from the retorting processes, with the possible exception of the TOSCO process, will require upgrading before the oil can be transported through pipelines to the final product refineries, which are expected to be located outside of the oil shale region. Modern refinery processes are suitable for subsequent upgrading. Each process also produces a retort gas that may be used within the plant as a fuel, or alternatively, to generate supplemental electrical power for nearby communities.

The residue or spent shale resulting from retorting is in the form of solid particles ranging from three inches in diameter to a fine powder, depending on the retorting method used. It will normally be dry, but it may be wet if it is processed to recover saline minerals. Extraction of saline minerals would minimize the possibility of leaching of them into groundwater supplies. Methods of disposal will therefore depend on the physical characteristics of the material, its water content, and the location of the disposal area, whether surface or subsurface. If it is to be returned to the mine, this will affect the mine development plans.

A 50,000 barrel per day plant would be expected to occupy somewhat less than 100 acres for crushing, crushed shale storage, retorting, oil

upgrading, oil storage, parking, office and shop facilities. The retorting plant itself would require five to ten acres of this total.

Off-site requirements for each plant would have an effect on the surrounding area to some degree. Access roads, power and gas transmission facilities, waterlines, and oil pipelines would have to be constructed. Because only one access road would be required for each site, relatively little land would be needed for road-building, although in some areas underpasses and suitable fencing might be required to reduce interference with wildlife migration patterns.

New power lines should be constructed in accordance with the environmental criteria outlined in recent Federal publications. Natural gas lines, if required, would be buried underground, using existing techniques for filling excavations, and reseeding of the right-of-way. Water supply lines would be buried, employing similar practices. Because the shale region is now predominantly rural, urbanization would inevitably have an environmental impact on the area. In general, most new permanent urban construction probably would be in existing population centers at or near the shale lease sites in each State. Temporary employment for plant construction would be substantial, creating need for temporary housing (trailer villages, for example) in addition to permanent housing. Expansion of support facilities (business districts, hospitals, schools, and other) would also result along with an accompanying environmental impact on the land. A few new small communities may appear but are likely to be scattered.

One of the greatest impacts would be in the requirement for water for the retort plants and the disposal of waste water. Approximately 29,000 acre feet annually would be required for a 200,000 barrel per day oil shale program.

In addition, as much as ten gallons of water per ton of shale could be produced in the surface retorts. This water would contain dissolved saline and organic compounds. It could be used to moisten the waste shale to prevent dust problems. However, it would require treatment prior to use to remove hydrocarbons and malodorous compounds, and perhaps dissolved minerals.

Large quantities of natural ground water occur in leached zones of the deep oil-shale areas, but the location, composition and movement of such waters have yet to be defined in many areas. These aquifers may contribute substantially to the overall water supply available to satisfy requirements for oil shale development.

The nature of the foreseeable problems associated with water quality would depend largely upon the mineral characteristics of the processed shale and the method of disposal. All foreseeable problems, outlined below, are controllable with present technology.

Protective measures such as wetting of spent shale piles, revegetation of mined areas, construction of canals and culverts for runoff water, and development dikes and terraces would be required.

Leaching is not believed a problem since waste piles tend to harden through natural cementation.

The rate of waste buildup from a typical 50,000 barrel per day plant (from ten to twenty feet per acre per year) would exceed the buildup of soil moisture from the low annual precipitation (one to two feet per year). Because of this, the water could not saturate the waste contamination, however, it may be necessary initially to construct a permanent impermeable floor where the waste material is to be deposited. This barrier would prevent the leach waters from entering underground water systems and would direct percolating waters toward the impoundment dams where they could be controlled for treatment; evaporation, or use.

In the shale-oil upgrading process, the principal source of contaminated water would be from steam condensed in the gas-processing facilities, which would contain dissolved organic compounds. This water would be purified by conventional refinery treatment techniques and used in processed shale disposal or similar reclamation programs. The water used in the cooling tower also may contain high concentrations of dissolved salts. Again, this would be conventionally treated and used in shale waste disposal.

The principal problems associated with a saline minerals-extraction industry would be those concerned with solids handling in stockpiling the spent shale prior to dawsonite roasting and in disposal of the denuded shale after alumina recovery.

No critical air pollution problems would be anticipated in connection with handling and utilizing the gases produced in oil shale retorting operations. Regardless of the retorting process, gases would be

co-produced with the oil product. The mixture of oil and gas products would be conducted via a closed system from the pyrolysis section of the process operation to a separation and recovery section, in a state varying from true vapor to mist to liquid, depending upon the particular process and its operating conditions. Treatment to recover the maximum amount of oil possible also would remove water and particulate matter. The remaining product gases yield small amounts of sulphur, which may or may not be economically recoverable.

Any power plants associated with oil shale development would produce stack gases which could be sources of air pollution. Such contamination would be avoided by using the adequate emission control techniques for removal of particulate matter and by the control of sulphur and nitrogen oxides emissions through the use of sulphur fuels, combustion temperatures control, and scrubbing.

If groundwater use for development and operation resulted in lowering of natural surface water features, such as springs and seeps, adverse impacts could occur upon associated ecological features, including wildlife and fish. Such degradation could be avoided in most cases by: lease site selection to avoid aquatic habitat; installation of equipment, procedures, and plans which would avoid loss of degrading substances to the surface waters; and construction and operating regulations and stipulations which would control polluting substances and keep physical alterations to a minimal level.

Mines and processing plants would intrude on natural setting while in existence. However, these facilities are expected to be in relatively remote locations away from highways.

The oil shale lands in Colorado, Utah, and Wyoming are located in a sparsely settled, semi-arid to arid region of moderately high elevation so the development of oil shale would have a limited impact on existing uses of the area.

Since much of the oil shale resource is on public lands, Federal regulations and controls could assure adequate environmental protection measures would be provided for in all development.

With the influx of population and improved accessibility, recreational activity in the region would increase. Some increased usage could be sustained, since the recreational potential of the region is largely untapped. There are limits beyond which the recreational quality of the region will begin to decline. The wildlife population could withstand greater hunting pressure; however, any decrease in the game population accompanied by an increase in hunters would decrease the amount of game recovered by each hunter.

To the extent that oil from shale could substitute for oil from the East Louisiana sale, the environmental impacts of development and transportation to market of East Louisiana oil would be avoided.

From the National security standpoint, oil shale development would provide an additional major source of petroleum products within the continental United States.

d. Product Transportation

Shale oil from the processing plant sites would be moved to refinery centers via pipelines from the sites to existing

transcontinental pipelines. These ten to twelve inch connecting lines could be constructed in some cases using existing rights-of-way to ensure minimum surface disturbance, with appropriate revegetation and positive maintenance to prevent leakage.

A major source of oil, located near the geographic center of the lower 48 States, would be developed and the oil products piped into existing transcontinental pipelines. The pipelines would avoid major earthquake regions. Maintenance would be reduced because of lesser opportunity for breaks caused by natural disasters.

The extent of impacts from oil losses, if they were to occur, upon habitat and associated wildlife and fish populations would depend upon numerous factors, including; Volume of oil lost, leak location, and weather conditions; the quantity and quality of wildlife and fish habitat affected; timing with respect to organism life history stages; and effectiveness of contingency plans. Most significant impacts would be on aquatic organisms and water-related birds and mammals. Such impacts would be minimized by building oil handling facilities and routing pipelines to avoid the more vulnerable habitats.

Construction of the pipelines together with the accompanying service roads would cause disruption of the vegetative patterns in a semi-arid region, but revegetation of the construction zone and maintenance of the service roads should minimize any adverse effects of this construction. Construction of service roads would provide public and hunter access to a presently little used area and will place pressure on wildlife.

e. Waste Disposal

Mining and waste disposal can be conducted either at the surface or underground. However, disposal of spent shale after retorting is directly related to the type of mining used. In addition, depending on the retorting method employed, the spent shale may vary in particle size from a fine powder to lumps which are up to three inches in diameter. As discharged from the retort, it will normally be dry, but water (10% to 20% by weight) may be used on the disposal piles to reduce dusting and aid consolidation. Transport to the disposal area may also be accomplished by a water slurry system.

References

General

Clean Energy Message, President of the United States, June 4, 1971.

Dinneen, G. U., Stanfield, K. E., Cook, G. L., and Sohns, H. W., Developments in Oil Shale Technology, Chemical Engineering Progress Symposium Series, Vol. 64, No. 85, 1968.

Proceedings of the First Five Oil Shale Symposiums, 1964-1968, Colorado School of Mines Quarterly, 1970.

Public Land Law Review Commission, One Third of the Nation's Land, Report to the President and Congress, June, 1970.

Ryan, J. J., and Welles, J. G., Regional Economic Impact of a U. S. Oil Shale Industry, Denver Research Institute, University of Denver, July 1966,

Savage, Harry K., The Rock That Burns, 1967.

Scharz, J. J., Potential Role of Unconventional Energy Sources in National Security, 1969-1985, Colorado School of Mines Quarterly, Vol. 64, No. 4, 1969.

U. S. Department of the Interior, Prospects for Oil Shale Development, Colorado, Utah, and Wyoming, Washington, D. C., May 1968.

U. S. Department of the Interior, Program Statement for the Proposed Prototype Oil Shale Leasing Program, Washington, D. C., June 1971.

Wells, Chris, The Elusive Bonanza, 1970.

Resource

Cashion, W. B., Geology and Fuel Resources of the Green River Formation, Southeastern Uinta Basin Utah and Colorado, U. S. Geological Survey Professional Paper 548, 1967.

Coffin, D. L., Welder, F. A., and Glanzman, R. K., Geohydrology of the Piceance Creek Structural Basin Between the White and Colorado Rivers, Northwestern Colorado, U. S. Geological Survey Hydrologic Investigations Atlas HA-370, 1971.

Culbertson, W. C., Geology and Mineral Resources of the Green River Formation, Wyoming, U.S.A., United Nations Symposium on the Development and Utilization of Oil Shale Resources, 1968.

Donnell, J. R., Tertiary Geology and Oil Shale Resources of the Piceance Creek Basin Between the Colorado and White Rivers, Northwestern Colorado, U. S. Geological Survey Bulletin 1082-L, 1961.

Donnell, J. R. and Austin, A. C., Potential Strippable Oil Shale Resources of the Mahogany Zone (Eocene), Cathedral Bluffs Area, Northwestern Colorado, U. S. Geological Survey Professional Paper 750-C, 1971.

Donnell, J. R. and Blair, R. W., Jr., Resource Appraisal of Three Rich Oil Shale Zones in the Green River Formation, Piceance Creek Basin, Colorado, Colorado School of Mines Quarterly, Vol. 65, No. 4, October 1970.

Duncan, D. C. and Swanson, V.E., Organic-Rich Shale of the United States and World Land Areas, U. S. Geological Survey Circular No. 523, 1965.

Ritzma, H. R. and Seeley, deBenneville K., Determination of Oil Shale Potential, Green River Formation, Uinta Basin, Northeastern Utah, Utah Geological and Mineralogical Survey Special Studies 26, January 1969.

Smith, J. W., Trudell, L. G., and Stanfield, K. E., Characteristics of Green River Formation Oil Shales at Bureau of Mines Wyoming Corehole No. 1, U. S. Bureau of Mines R. I. 7172, September 1968.

Smith, John Ward, et al., Oil Yields of Green River Oil Shale from Colorado Corehole No. 1, U. S. Bureau of Mines R. I. 7071, 1968.

Stanfield, K. E., et al., Oil Yields of Sections of Green River Oil Shale in Colorado, Utah, and Wyoming, U. S. Bureau of Mines R. I. 5081, (1955); 5321, (1957); 5614, (1960); 6420, (1964); and 7051, (1967).

Trudell, L. G., et al., Green River Formation Lithology and Oil Shale Correlations in the Piceance Creek Basin, Colorado, U. S. Bureau of Mines R. I. 7357, 1970.

U. S. Department of the Interior, United States Energy=A Summary Review, 197

Mining

East, J. H., Jr. and Gardner, E. D., Oil-Shale Mining, Rifle, Colorado, 1944-1956, Bureau of Mines Bulletin 611, 163 pp., 1964.

Katell, Sidney and Wellman, Paul, Mining and Conversion of Oil Shale in a Gas Combustion Retort, U. S. Bureau of Mines Technical Progress Report 44, October 1971.

Murray, R. G., Economic Factors in the Production of Shale Oil, presented at the 74th National Western Mining Conference, Denver Colorado, February 1971.

Retorting (Surface)

Cameron, R. J., The Cameron and Jones Vertical Kiln for Oil Shale Retorting, Proceedings of the First Five Oil Shale Symposiums, 1964-1968, Colorado School of Mines Quarterly, pp. 315-30, 1970.

Clampitt, R. L., Gasz, J. W., Jagel, K. I., and Lawson, J. E., Gas Combustion Retorting Performance in a Large Demonstration Retort, presented at the AIME 100th Annual Meeting, March ?, 1971.

Hall, R. N. and Yardumian, L. H., The Economics of Commercial Shale Oil Production by the TOSCO II Process, Presented to 61st AICHE Annual Meeting, Los Angeles, December 1-5, 1968.

Hartley, F. L., Union Oil's Shale Program - Progress Report, presented at Colorado Mining Association Meeting, Denver, Colorado, February 7, 1957.

Irish, G. E., Oil Shale Retorting Oil with Shale Recycle, U. S. Patent 3,288,869, assigned to Union Oil Company, May 19, 1964.

Lenhart, A. F., The TOSCO Process - Economic Sensitivity to the Variables of Production, API Proceedings, Refining Division, pp. 907-24, 1969.

Matzick, Arthur, et al., Development of the Bureau of Mines Gas-Combustion Oil-Shale Retorting Process, U. S. Bureau of Mines Bulletin 635, 199 pp., 1966.

Rammler, R., The Distillation of Fine-Grained Oil Shale by the Lurgi-Ruhrgas Process, United Nations Symposium on the Development and Utilization of Oil Shale Resources, Tallinn, USSR, 1969.

Rurark, J. R., et al., Gas Combustion Retorting of Oil Shale Under Anvil Points Lease Agreement: Stage I, U. S. Bureau of Mines R. I. 7303, 1969.

Retorting (In Situ)

Burwell, E. L., Carpenter H. C., and Sohns, H. W., Experimental In Situ Retorting of Oil Shale at Rock Springs, Wyoming, U. S. Bureau of Mines Technical Progress Report 16, June 1969.

Burwell, E. L., Sterner, T. E., and Carpenter, H. C., Shale Oil Recovery by In Situ Retorting - A Pilot Study, J. Of Petroleum Technology, December 1970.

Dougan, Paul M., Reynolds, Fred S., and Root, Paul J., The Potential for In-Situ Retorting of Oil Shale in the Piceance Creek Basin of

Northwestern Colorado, Colorado School of Mines Quarterly, Vol. 65, No. 4, 1970.

Grant, Bruce F., Retorting Oil Shale Underground - Problems and Possibilities, Colorado School of Mines Quarterly, Vol. 59, No. 3, July 1964.

Shale Oil Processing

Benson, D. B. and Berg, L., Catalytic Hydrotreating of Shale Oil, Chem. Engr. Progress, Vol. 62, No. 8, pp. 61-7, August 1966.

Carpenter, H. C., et al., A Method for Refining Shale Oil, I&EC, Vol. 48, pp. 1139-1145, July 1956.

Carver, H. E., Conversion of Oil Shale to Refined Products, proceedings of the First Five Oil Shale Symposiums, 1964-1968, Colorado School of Mines Quarterly, 1970.

Cottingham, P. L. and Carpenter, H. C., Hydrocracking of Prehydrogenated Shale Oil, I&EC Process Design and Development, Vol. 6, No. 2, pp. 212-17, April 1967.

Hellwig, K. C., Feilelman, S., and Alpert, S. B., Upgrading Feeds by the H-Oil Process, Chem. Engr. Progress, Vol. 62, No. 8, pp. 71-4, August 1966.

Montgomery, C. P., Refining of Pyrolytic Shale Oil, I&EC Product Research and Development, Vol. 7, No. 4, pp. 274-82, December 1968.

Environmental Impacts

Committee on Environmental Problems of Oil Shale, Environmental Problems of Oil Shale, State of Utah, February 1971.

Hand, John W., Planning for Disposal of Oil Shale Chemical and Mine Wastes, Colorado, Geological Survey Special Publication No. 1,

Governor's Conference on Environmental Geology, Denver, May 1-2, 1969, pp. 33-37.

Hutchins, John S., et al., The Environmental Aspects of a Commercial Oil Shale Operation, AIME Environmental Quality Conference, June 1971.

Nevens, T. D., Culbertson, W. J., Jr., and Hollingshead, R., Disposal and Uses of Oil Shale Ash, Final Report, U. S. Bureau of Mines Project No. SED-8, submitted by Denver Research Institute, April 1970.

Nevens, T. D., and Rohrman, F. A., Gaseous and Particulate Emissions from Shale Oil Operations, ACS Div. of Fuel Chem. Preprints, Vol. 10, No. 1, pp. 65-72, March 22-31, 1966.

Special Committee of the Governor's Oil Shale Advisory Committee, Report on Economics of Environmental Protection for a Federal Oil Shale Leasing Program, State of Colorado, January 1971.

U. S. Department of the Interior, Draft Environmental Impact Statement for the Prototype Oil Shale Leasing Program, Washington, D. C., June 1971.

Ward, J. C., Margheim, G. A., G.O.F. Lof, Water Pollution Potential of Spent Oil Shale Residues from Above-Ground Retorting, Colorado State University, Fort Collins, Colorado, 1970.

Wyoming Oil Shale Environmental Planning Committee, Environmental and Economic Report on Wyoming Oil Shale, State of Wyoming, February 1971.

9. Stimulation of Recovery from Known Deposits

The most commonly employed methods currently used to stimulate production from oil and gas reservoirs involve "acidizing" and/or "fracturing" the formation. When used in the conventional manner, the results from individual well stimulations of currently producing formations may have little noticeable effect upon the total energy picture. One method, nuclear stimulation, does have the potential of materially adding to the nation's recoverable gas reserves.

This alternative would use nuclear explosives to fracture low permeability gas reservoirs incapable of sustaining commercial flow rates. To the extent that natural gas supplies could displace crude oil demand, this method might be considered a partial alternative to OCS development. It is not now considered a practical alternative because the commercial technology remains to be developed. Negligible supplies from this alternative are expected prior to 1980.

Several years of development work need to be carried out before the nuclear stimulation technology will be available for commercial applications. Assuming successful development of the technology, the AEC estimates that nuclear stimulation could add some 1 trillion or more cubic feet of natural gas to U. S. production per year beginning in the late 1970's or early 1980's. Adverse environmental impacts from nuclear gas stimulation on a commercial scale should be small in comparison to the benefits obtained.

Current emphasis in the U. S. Atomic Energy Commission's Plowshare program is to develop the technology for applying the effects of nuclear explosions to the recovery and utilization of natural resources, primarily natural gas. The program plan is to continue the design and testing of a unique explosive, and to assess by field tests techniques for utilizing the effects of multiple nuclear explosives to recover natural gas locked in tight geological formations--gas which currently cannot otherwise be economically produced.

Projects Gasbuggy and Rulison are clearly demonstrating that recovery of natural gas by nuclear explosion stimulation is technically feasible and holds economic promise. Both of these projects were essentially pilot experiments involving the detonation of a single nuclear explosive. The next development phase involves techniques for using multiple explosives in a single wellbore based on the fact that gas formations amenable to nuclear explosion stimulation are thicker than can be effectively and feasibly stimulated by a single explosion.

A recent report on the possible scope of nuclear stimulation, together with an economic assessment of the technical programs needed to achieve commercially viable application of nuclear stimulation of natural gas wells, indicates that, based on certain assumption, "over 10 percent of the Nation's current gas consumption could be met by gas from nuclear stimulation by a development rate of about 50 wells per year". Analysis

of the data in the report indicates that it would take approximately 20 years before gas produced from stimulated reservoirs would be about equal to 10 percent of 1969 consumption. To accomplish this level of production it would be necessary to explode 4,000 nuclear devices of 100-kilotons each in 1,000 wells over the 20 years.

Most natural gas resources amenable to nuclear stimulation are located in the Rocky Mountain region in fields estimated by the Bureau of Mines to have approximately 317 trillion cubic feet of gas potentially available by natural gas stimulation.

The current development program rate is not expected to provide for production in the next ten years of quantities of natural gas that would be meaningful in comparison with present sources of supply.

Discussions of environmental impacts applicable to the current nuclear stimulation program may be found in the Atomic Energy Commission's environmental statements concerning projects in Rio Blanco County, Colorado, and Sublette County, Wyoming.

Potential Environmental Impacts

Air Quality

The AEC's Plowshare program of nuclear stimulation for increased natural gas production from tight reservoirs will produce no major adverse effects on air quality. There would, however, be some radioactivity associated with this gas. This is discussed below.

Detonation Period

The depth of the gas formations of interest throughout the Rocky Mountain area is such that the probability of releasing any radiation to the atmosphere at detonation time is very low. Even so, every reasonable precaution would be taken during the field development program to prevent even a slight accidental seepage of radioactive gas to the atmosphere. If an unforeseen seepage of radiation were to occur, previously developed remedial plans would be initiated. Although radiation would not be expected to be detected, long- and short-term radiation monitoring techniques would be employed during field development.

Production Testing

The production testing technique for current experiments involving initial flaring of gases containing low levels of radioactivity is not contemplated for commercial production. All produced gas is expected to be fed into commercial pipelines. If that proves not to be possible, then some flaring as in the first experiments might be utilized.

Gas Quality

The chemical composition of the gas in each stimulated well is assumed to be similar to that measured in the first experiments. The initially large carbon dioxide concentration in the chimney would be reduced by dilution with pipeline gas or carbon dioxide would be removed by standard gas field practices.

Gas production from the wells would be delayed until short-lived radionuclides decayed. Technical information from subsequent experiments will aid in defining the time for initiation of production.

The remaining gaseous isotopes--tritium and krypton-85--are calculated to provide less than one millirem per year of exposure to the general population if the gas were used as a part of the total gas supply to a large city. No insurmountable problem is anticipated in meeting future regulations or standards developed for sale of the gas. It should be emphasized that the environmental impact of using gas that contains small amounts of tritium will have to be weighed against not having the gas available to augment the Nation's energy resources.

Water Quality

Ground water conditions in a substantial portion of the area which may be developed are well known on the basis of studies already performed. In contemplated development, stimulated volumes of broken rock (chimney) would be separated horizontally from each other and vertically from zones containing mobile water by distances generally in excess of 1,000 feet. Thus, each chimney would be an isolated region and no adverse hydrologic effects would be anticipated. No contamination of surface waters is anticipated.

Fish and Wildlife

The detonation days will be selected to fall outside the principal hunting seasons of the production areas. There should be no effect on

the long-term hunting potential of the region. Fishing will be affected only on detonation days in areas closed for reasons of ground motion safety.

Vegetation

Some small impact on vegetation will result from road building for access to well sites, and from clearing of drill site areas for drilling and production operations. Drill site locations will return to natural conditions in a short period. This would be similar to conventional gas well drilling and production.

Land Values and Uses

Production Use

The areas affected by natural gas stimulation will be quite small and no significant impact on productive use will occur.

Recreation

Some slight impact on land use for recreation near development sites will occur, but will be of minimal extent and duration. Additional means of access to isolated regions will increase opportunities for hunting, fishing, and other recreation activities.

Aesthetic

After development is completed, no adverse aesthetic effects will be evident. There will be no permanent gas well derricks and very little hardware observable on the surface. Access roads will be of limited extent and public acceptance should be anticipated.

Superposed Socioeconomic Systems

Full development would be accompanied by additional construction in the areas affected. Each stimulated well would have construction activities, but decreasing in complexity as the transition is made from experimental to commercial.

There would be roads and gathering pipelines to all of the locations and normal gas-well completion equipment. Extension of power and telephone lines can be expected. Gas processing plants, warehousing, and office facilities would be constructed in the area.

The need for local services and materials will have relatively little effect during the first experiments, but as the field development program advances, the need will become greater. Long-term employment associated with full field development could involve thousands of direct gas industry employees. Current local sources of supplies and services would have to be substantially increased or supplemented. Since much of the work would be conducted year-round, undoubtedly there would be families moving to the areas, causing an increase in such community needs as schools and homes. Additional revenue would be forthcoming to the counties, as well as to the State and Federal Governments.

Other Possible Adverse Impacts

The development of nuclear stimulation of natural gas reservoirs will be accompanied by some possible damage to existing structures, including mines, houses and other buildings, and dams from the ground motion produced by the nuclear explosions. Damages would have to be repaired, or

compensation rendered to owners. Ground motion is predicatable and utmost care would be used to minimize this effect.

It has been suggested that residual stress from a number of detonations might accumulate and present an earthquake stimulation hazard not present in a single detonation. The best evidence available on this point is from experience with the Nevada Test Site, where data from seismic wave generation and from stimulated fault motion indicate that the cumulative effect of many explosions is to reduce ambient stress levels rather than to increase them. A recent series of high-precision geodolite measurements indicates, also, that the residual strain field around a single explosion site tends to relax with time. In any case, observations of the seismic effects of a series of detonations would permit continuing appraisal of this issue. In the light of present information, it does not appear to constitute an adverse environmental impact.

Adverse environmental impacts for nuclear gas stimulation on a commercial scale should be small in comparison to the benefits to be obtained. Both oil and gas will be needed in increasing quantities in the future.. The proposed project is supplemental to other means of increasing natural gas supply. Some quantities of natural gas that would meet clean fuel requirements could be made available in the 1975-1980 time frame if nuclear gas stimulation technology is vigorously pursued.

The public acceptance questions involved in the nuclear stimulation of natural gas production exceed any likely technical or environmental problems.

10. Increased LNG Imports

a. Description of the Alternative

Liquefied natural gas [1/] (LNG) has been in commercial use since 1940. Because of the more than 600 to one volume reduction caused by the liquefaction process, large volumes of natural gas in a liquefied form are easy to transport and to store. Until recently LNG has been used primarily by gas utility companies for peak-shaving purposes and for remote and emergency deliveries. Due to this short-term need LNG has been imported on a limited quantity basis. This has changed, however, with the FPC's approval in March 1972 of a 20 year project to import LNG from Algeria at the rate of 42 million cubic feet per day. Further applications are pending which could increase LNG imports by 1,000 million cubic feet/day. Unlike oil, the importation of LNG, at present, is not subject to import quotas. The only constraint upon increasing importation is the necessity of obtaining FPC approval of any project. Before approving a project the FPC solicits the advice of the Departments of State and Defense.

If the proposed OCS sale is withdrawn and the expected production replaced by LNG, imports would have to increase in the range of 600 to 1,200 million cubic feet/day. This figure represents the expected gas production of 200,000 to 400,000 mcf/day, plus 400,000 to 800,000 mcf/day to substitute for the expected oil production. An increase in imports of this amount would require an additional LNG tanker shipment, approximately

1/ Natural gas becomes liquid at -25°F at atmospheric pressure.

every 2-5 days. As mentioned earlier, plant conversion could make complete gas-for-oil substitution difficult in the short-run.

These figures are based on the assumption that all the projects which have been filed with the FPC, and all the ones which have been tentatively proposed by industry, will be in full operation by 1980.

The following table presents FPC's projections of the availability of LNG imports to 1980. The daily figures were derived from projections of annual imports.

LNG Imports 2/

Year	Quanity MMCF/Day
1975	800
1976	1,900
1977	2,700
1978	3,600
1979	4,700
1980	5,500

Since production from the East Louisiana sale is expected to be on-stream in six years, it is apparent that LNG imports will have to increase above projected levels by a factor of 17% to 33% in 1978. This would indicate that there would have to be an equivalent increase in either the size or number of the highly specialized liquefaction and gasification plants now being proposed and in the number of LNG tankers that will be built over

1/ Federal Power Commission, Bureau of Natural Gas "Nation Gas Supply and Demand 1971-1990, Staff Report #2," pg. 70.

the next six years. There also exists about a six-year lead time before an LNG operation can reach full capacity. It would seem, therefore, that the industry would have to be given incentives immediately to increase the number and size of projects.

The source of this LNG will have to be from countries with a surplus of natural gas. Predictions of future international production indicate that those areas having the greatest surplus will be in Central and South America, and in Africa. The most likely source of supply in the time frame encompassed by this sale seems to be Algeria. This preference is indicated by the number of industry proposals listing Algeria as their main source of supply. Thus, as in the case of increased oil imports, a large part of this imported LNG will come from relatively politically unstable areas. This could increase the possibility of a supply interruption.

The price of the gas produced from LNG will be considerably higher than the price of the new gas expected from this sale. The projected prices of LNG as filed with FPC delivered to Eastern ports range from 65 cent/mcf to 69 cent/mcf. The highest price that could be paid for gas from offshore Louisiana was 25.5¢/mcf. Because of the large area that would be served by the new OCS gas or the LNG which could be substituted, it is difficult to make a comparison of city-gate prices. It is unlikely, that the difference in transportation cost would make the city-gate price of LNG equal to the city-gate price of OCS gas. Thus large-scale importation of LNG would result in higher costs for the consumer.

b. Environmental Impacts:

The alternative of increasing LNG imports could have an effect on the environment in several different ways. These potential impacts are best analyzed by looking at four major areas: increased use of natural gas, the construction and operation of the regasification plants, the construction of pipelines and the safety of ship transportation.

(i) Air Quality

The use of LNG imports as a substitute for the production expected from the East Louisiana sale, could have a favorable impact on the environment through the replacement of crude oil by natural gas. Natural gas is by far the least polluting of all fossil fuels. Thus the use of natural gas could lead to a much cleaner environment. The quantity of crude oil, however, that will be replaced is extremely small when compared to the total projected domestic consumption of oil. It is doubtful, therefore, that this substitution will have a significant effect on the atmosphere.

(ii) Construction and Operation of Regasification Plants

The construction of the regasification plants will cause a definite disruption of the land and water resources resulting from the effects of additional dredging on the marine environment and from the preemption of coastal lands necessary to provide a site for the facilities. The extent and duration of this impact will depend on the size and location of the plant. For example a plant now being proposed at Cove Point, Md., would produce 650 million cubic feet per day and require a 1,022 acre tract of land. Another plant proposed at Savannah Ga., would produce 335 million cubic feet per day and require 860 acres. This alternative could require the construction of at least one large plant with the

consequent commitment of about 1,000 acres. During construction there will be some disruption of the land surrounding the plant. If proper techniques are used, this disruption, however, should be temporary.

A regasification plant also requires facilities to permit the transfer of LNG from tankers to storage areas. In the Cove Point case, this could be accomplished by the construction of a mile-long pier into the Chesapeake Bay. At the proposed Savannah River to allow the tankers to come close to the plant. Both of these methods will require dredging, causing increased turbidity of the water and disruption of bottom sediments. This disruption should also be temporary.

The construction of regasification plants will also have an impact on both land and marine animals. During the construction period there will be some damage to the natural habitat of the land animals. However, this damage will be permanent only in the area occupied by the plant. Any surrounding areas that are damaged should return to a near-normal condition after construction is completed. The dredging operation could also disrupt the marine habitat, especially in the case of bottom-dwelling organisms. In most cases this disruption would be temporary, but care would have to be taken to avoid, as much as possible, commercial fishing areas.

The choice of the plant site is an important factor in minimizing the impact on scenic qualities and recreational activities. An esthetically pleasing plant would reduce the disruption of scenic views. The increase in ship traffic will inevitably have an effect on water-oriented recreational activities. Therefore, in choosing the location of a plant, popular

recreation areas should be avoided.

The actual regasification process involves little environmental risk. The Cove Point plant plans to use natural gas in the regasification process and will avoid potential water and air pollutants. The Savannah plant plans to use water drawn from the river to regasify the LNG. After going through the vaporizers, the temperature of the water will be lowered 50°F and then be returned to the river. Lower water temperature could actually be benefical by allowing the water to hold more oxygen, which might counteract some pollution from upstream.

A major concern of any regasification project will be to insure that proper precautions are taken during the handling and storage of the LNG. One of the early LNG plants was destroyed by a disastrous fire due to the failure of a storage tank. One hundred deaths occurred as a result. There have been many improvements in the technology of storage and handling and increased attention has been given to develop proper safety precautions. The possibility of fire, however, must always be considered in the development of LNG plants.

(iii) Construction of Pipeline

After the LNG has been regasified it can be transported through any existing gas pipeline. Thus, existing pipelines will be used if they are available. New pipelines, however, will be required in some areas. The potential environmental impact of the new lines will be the same as for regular gas lines. The impacts of this construction has been

examined in the section of this statement dealing with the effect of increasing onshore U. S. gas production.

(iv) Transportation

The chance of a major spill is a potential hazard associated with increased LNG imports. A study conducted by the Bureau of Mines has indiciated that there exists the possibility of an explosion resulting from an LNG spill. Since spilled LNG would not vaporize instantaneously, the release of the equivalent of several million cubic feet of gas might cause a substantial fire which would continue until all the LNG had vaporized. Because it would vaporize the LNG would cause little contamination of the water. The Bureau of Mines report did indicate, however, that the concentration of natural gas in the area of the spill and downwind from the spill would be significantly higher than normal.

Another hazard resulting from this alternative is the increased amount of ship traffic needed to carry the LNG. This would raise the probability of a collision, possibly resulting in a major fire.

Their tests indicated that under certain conditions small-scale explosions resulted when the LNG was poured onto water. They were not able, however, to predict the result of a large-scale spill on open-water. 1/ Another study done by Shell Piple Line Corporation concluded that there was no danger of normal LNG exploding when spilled on water. They felt explosion would result only after the methane content of the LNG had reach 40%. Since the normal methane content is 80-90% and the boiling rate is 0.2%-0.3%

1/ Bureau of Mines, USDI, "Hazards Associated with the Spillage of Liquefied Natural Gas on Water" pg. 23.

per day, they felt that with present day shipping practices a reduction to 40% would not be possible. 1/ Futher discussions with Bureau of Mines indicated that an explosion resulting from an LNG spill in open water is unlikely. The chief hazard from a spill, however, would be fire.

1/ Shell Oil Company News Release, February 21, 1972

References

Bureau of Mines, USDI, "Hazards Associated with the Spillage of Liquefied Natural Gas on Water", RI 7448, November 1970.

Bureau of Natural Gas, FPC, National Gas Supply and Demand 1971-1990 Staff Report, No. 2, 1972.

Federal Power Commission, "Second Report on Liquefied Natural Gas", News Release No. 17816, October 18, 1971.

Koerner, William R., Jr., "Initial Brief of Commission Staff" FPC Docket Nos. CP71-68; CP71-153, CP71-290; CP71-151, CP71-264; CP71-276; CP71-289, August 16, 1971.

"

Shell Oil Company, New Release February 21, 1972.

Weatherwax, David E., et. al. "Initial Brief of Consolidated System LNG Company," FPC Docket Nos. CP71-68; CP71-153, CP71-290; CP71-151; CP71-264, CP71-279; CP71-289; February 7, 1972.

11. Synthetic Natural Gas

a. Summary

Through hydrogenation processes, it is possible to convert coal to various forms of liquids and gaseous forms as a substitute for natural oil and gas. Considerable research and development has been done and is in progress by the Federal Government and by private industry, and certain technologies have been demonstrated at commercial production scale which are not now economically competitive. Much of the work in progress is summarized in Department of the Interior's 1972 coal research report (USDI, Office of Coal Research, 1972).

The President, in his Clean Energy Message of June 4, 1971, and his subsequent requests, has given special attention to the acceleration of coal gasification. Similar acceleration of coal liquefaction technology development could result in economically feasible conversion process that could provide an alternate source of oil. The environmental impacts of coal mining are discussed in detail in previous sections and are not repeated here.

The feasibility of using such processes as an alternative to the production from the proposed sale depends upon the rate at which technological systems are developed, tested and proved to be economically viable and commercial scale plants could be built. It is possible that such could occur in time to produce substantial amounts by 1980-1985, but no meaningful forecast can be made at this time.

b. Coal Gasification

Discussion.--The need for natural gas, and its desirable clean-burning characteristics, have been discussed in the section of Federal Power Commission natural gas pricing policies. Because of its clean-burning characteristics, gas is particularly preferable for use in small installations--such as for home heating--where economic considerations preclude extensive installation of pollution--control equipment.

In the event of gas shortage, industrial and commercial uses are likely to be the first curtailed, and residential uses the last. Steam-electric power plants, some of which can use more than one type of fuel, may be the first to be denied the use of pipeline-quality gas.

Coal also can be converted to a clean, low-Btu gas for use under utility boilers. Although such synthetic gas can be piped some distance, it may be more economical to use it adjacent to the coal gasification plant.

While no coal to pipeline-gas process has yet reached commercial application production in the United States, at least one company plans to construct a commercial coal-gasification plant using the Lurgi process, which has been known for a number of years, and has been applied commercially in Europe (The Oil Daily, August 20, 1971). The earliest date for production from these projects is 1976. Since gas produced by the Lurgi process has heating value of only 400-450 Btu/cf, catalytic methanation is required to achieve pipeline quality of 1000 Btu/cf for American gas utility use. This step has not yet been commercially demonstrated.

The Department of the Interior has been investigating processes for producing pipeline quality gas from coal. The Office of Coal Research has erected two coal gasification pilot plants, one using the Institute of Gas Technology "HYGAS" hydrogenation process, and the other using a "CO_2 Acceptor Process" to convert lignite into a methane-rich, sulphur free gas. A third pilot plant incorporating a "BI-GAS" process to produce high-Btu gas has been funded and will be built and operated.

Research over a period of fifteen years by the Bureau of Mines has culminated in the development of the "Synthate" process. In June 1971, a contract was let to Lummus for design of a pilot plant; a contract for construction may be let in the autumn of 1972. A draft environmental statement (DES 72-3) as released January 24, 1972. Meanwhile, a smaller pilot plant will be operated by Hydrocarbon Research, Inc., under a contract with the Bureau. The Bureau also has under review another coal gasification-scheme, termed a modified Lurgi process, to use strongly caking coals for making a clean low-Btu gas.

It will require about 6 million tons of coal a year to support one 250 billion Btu per day coal gasification plant (minimum commercial size). Because mining efficiency generally declines at capacities greater than about 4 million tons a year, two mines would be needed. Thus, a coal gasification plant would have to located near two mines each producing about 3 million tons annually. Estimates for the cost of a plant to process 250 million cf a day are $180 million including the coal mine. Recent estimates by the Office of Coal Research, and the Bureau of Mines, using utility type economics, project a selling price for the gas of about

64 cents per MM Btu at the plant. Columbia gas systems recently cited a figure of 85 cents with coal at $5.50 per ton. Revisions of these figures can be expected as pilot plants projects are evaluated and technology developed.

The status of coal gasification research is discussed by Forney and others (1968, 1970a, and 1970b) and Mills (1970).

In his Clean Energy Message (June 4, 1971) the President urged greater efforts in coal gasification. To implement this acceleration, budget increases have been requested and the Office of Coal Research and the American Gas Association have agreed to jointly fund an expanded program of pilot plant testing and other investigations of coal gasification technology. Each year the Government would provide $20 million and the gas industry $10 million, principally to accelerate work on the three major OCR products mentioned above.

c. Oil Gasification as an Alternative to Coal Gasification

Another route to synthetic natural gas (SNG) being considered is oil gasification, using refinery feedstocks. Processes that have been considered are:

1. Thermal cracking in steam.
2. Thermal cracking in a hydrogen-rich atmosphere.
3. Catalytic cracking in steam.
4. Partial oxidation.

Currently, much attention is being given to catalytic processes, particularly one developed by the British Gas Council. Called the CRG (Catalytic

Rich Gas) process, it can gasify a wide variety of hydrocarbon feedstocks. Attention now is concentrating on naphtha.

In a CRG plant, there are two basic operations:

1. Feed preparation, including fractionation and desulphurization.
2. The CRG process, per se, including gasification, and methanation to a gas with a heating value of 980 Btu per cubic foot.

Desulphurization of the feedstock is accomplished by mixing the feed with hydrogen-rich gas, vaporization, and treatment with nickel-molybdate and zinc oxide catalyst. If sulphur recovery is essential to the process economics, the sulphur-rich fraction is hydrodesulphurized, followed by a Clause unit.

The majority of plans for SNG plants involve feedstocks from foreign sources. More than a dozen applications have been made for quotas for importing naphtha and other feedstocks to make synthetic natural gas. Most of these are for imports of naphtha, others are for LPG and crude oil. Estimated costs for SNG range from $1.00 to $1.60 per MM Btu.

The Consumer Power Co., Marysville, Michigan, is installing a CRG plant with a capacity of 100 million standard cubic feet daily of SNG, using 25,000 barrels per day of naphtha imported from Canada.

The environmental impacts of such plants would be expected to be less than those of coal-based plants, same size and location, because ash and char, and sulphur oxides and particulates discharge would not be involved.

d. Coal Liquification

Until recently, there has not been the same sense of urgency with reference to the conversion of coal to clean-burning oil as exists for pipeline gas. One reason is that imported oil has been available at cheaper prices than a synthetic crude. Also, environmental restraints have forced some electric utilities to abandon the use of coal, or to forego its use in new plants. The supply of low-sulphur coal in the East is limited, additional natural gas for electric utility use is not now available to householders and commercial users, electric utilities may soon be restricted or banned from using natural gas.

Accordingly, the supply problem relating to oil now is being viewed in a more urgent context. The situation, however, as regards the necessity for developing coal-to-oil technology is not yet escalated to a crash program basis.

The Department of the Interior has filed a Final Environmental Statement, and will soon erect at Fort Lewis, Washington, a Solvent-Refined (SRC) pilot plant. Consideration is now being given to the conversion of Project Gasoline and the pilot plant at Cresap, West Virginia, to a simplified version of what is known as the H-Coal process. This research could result in a commercial process for producing a clean-burning (low-sulphur) oil for power plant and industrial use. The Bureau of Mines recently found high coal conversion to a low-sulphur oil in a new type of catalytic reactor; this discovery may lead to a feasible coal-to-oil process.

Because coal-to-gas, oil-to-gas, and coal-to-liquid fuel plants would be similar in most respects (boilers, reactors, gas scrubers, etc.) the environmental impacts would be similar.

e. Potential Environmental Impact of the Alternatives

Like natural gas, synthetic (also called substitute) natural gas and oil from coal are clean-burning fuels because the sulphur has been reduced to very low values, and no particulate matter is emitted at the point of combustion.

Since there are ample reserves of coal in this country, conversion plants would afford a reliable supply of synthetic fuels for many years, whereby reducing dependence on imported oil and LNG, and concomitantly lessening the potential adverse environmental effect associated with shipping these fuels and delivering them in ports.

Owing to the fact that this report is general, and does not bear on a particular site in the United States, the importance and magnitude of the possible environmental impacts cannot be adequately assessed. Obviously, the impacts will vary greatly with plant location.

Also to be considered is the fact that there is no commercial plant in operation, consequently, no data are available concerning the impacts of constructing and operating such plants. However, on the basis of some limited pilot plant data, and knowledge of other industrial plants and complexes, some estimates can be made about the principal environmental impacts.

Site preparation and plant erection will have environmental effects; the kinds, importance, and magnitude of which will depend on the site that is selected. Consideration would be given to the effect on factors such as earth, water, flora, fauna, land use, recreation and aesthetics.

Plant operation, consisting of handling and transporting the coal to the process, and converting the coal to gas and/or oil will involve very large quantities of water for cooling and scrubbing gases, and very large quantities of devolitalized coal, called char, which will be burned in boilers to generate process steam and power, or gasified to make process hydrogen. Major emissions that must be controlled are:

1. Sulphur and nitrogen oxides, bottom ash and fly-ash from the plants generating process steam and power. Fly-ash emission from boiler stacks can be controlled, and furnace-bottom ash and slag are handled routinely without environmental problems. However, it may become desirable to locate large coal-conversion plants near large strip mines, where ash and slag from the process would be returned to the open cuts, and the ground restored in accordance with environmental considerations. The technology for controlling sulphur and nitrogen oxides, however, is not yet available commercially.
2. Contaminated water discharges containing phenols, cresols, benzene, oils, tars, and ammonia gaseous discharges from

the Claus tail gas containing some hydrogen sulphide dioxide; and solid discharges such as char and ash; and possibly solids from gas-scrubbing systems using solid sorbents such as dolomite. Process waste waters can be controlled by treatment and re-use. Claus tail gas can be scrubbed free of sulphur compounds. Waste solids such as spect dolomite may present disposal problems in terms of available space and/or surface water contamination, but these are not insurmountable problems.

3. Noise will occur from mechanical equipment, injectors, and pressure-reduction devices, but is unlikely that it would be a problem beyond the plant property lines.

To illustrate the order of magnitude of the major emissions that would have to be handled from a commercial coal-to-pipeline gas plant, the Federal Power Commission gave the following estimates, based on a plant producing 250 million standard cubic feet per day of pipeline gas*, from coal with 3.7 percent sulphur:

	tons per day
Sulphur (mainly as hydrogen sulphide)	300-400
Ammonia	100-150
Phenols	10-70
Benzene	50-30

1/ The size SNG plant produces the equivalent of 40,000 bbls per day of crude petroleum.

	tons per day
Oil and Tars	trace to 400
Ash (based on coal with 10% ash)	1500

The Federal Power Commission report describes in detail the general means for controlling contaminants in the process waste waters, and the various gas steams.

f. Transportation of Products to Markets

The transportation of gas or oil produced from domestic natural or synthetic sources has the potential for certain unfavorable effects. Such effects depend upon the type and nature of terrain over which the pipeline will traverse. The clearing of rights-of-way necessitates the removal of plants, including trees and shrubs, growing on the area; the ditching operation disturbs grass and other low-growing vegetation as well as top soil; the construction operation may cause some damage to plants growing alongside the right-of-way, as well as to areas used as access roads for the movement of material and equipment; and construction across rivers and lakes may damage banks and temporarily disturb fish and other aquatic life in the immediate vicinity of the construction. If the gas must be moved for considerable distances, there will be a need to construct compressor stations and, depending upon the quality of the gas stream, treatment plants may be necessary. These above-ground facilities have the potential for affecting the aesthetic of the surrounding areas as well as creating problems of sound, air, and water quality.

While the construction of pipeline facilities has the potential for causing unfavorable environmental effects, the employment of good construction techniques can minimize or even eliminate most of these effects. Farming or grazing lands can be restored to their original condition after no more than one growing season by replacing top soil and replanting grass or crops. The aesthetics of wilderness areas can be preserved by using existing rights-of-way, or minimizing the width of new rights-of-way, and by using such techniques as feathering and screening or deflecting entrance ways. Any displacement of wild animals will only occur during the construction operation.

Cofferdams and other diversionary techniques can be used to permit the continued flow of streams during construction, and banks can and should be stabilized to avoid erosion during construction. Access and service roads should be maintained with proper cover, water bars and appropriate slope to avoid soil erosion. Compressor stations and other above ground facilities can be located in unobstrusive sites and planted with appropriate trees and shrubs to enhance their appearance; location, planting, and exhaust design can be used to abate excessive noise associated with operation of the compressor stations. Treatment plants can be located and equipped with devices to minimize any adverse effects upon air quality and suitable means, e.g., evaporation ponds or disposal wells, can be found for preserving the water quality of the surrounding area.

Every effort should be taken to avoid the construction of pipeline facilities in parks, scenic areas, wildlife refuges and places noted for their historic value.

Natural gas pipelines constructed under authorization granted by the Federal Power Commission must conform to the above techniques.

References Cited

Coal Gasification

Federal Power Commission, National Gas Survey, Synthetic Gas-Coal Task Force. Environmental Considerations in Coal Gasification Plants.

Forney, A. J., Kenney, R. F., Field, J. H., 1968, Fludi-Bed Gasification of Pittsburg-Seam Coal with Oxygen and with Air, Preprints, Division of Fuel Chemistry, Am. Chem. Soc., Vol. 12, No. 3, pp 32-42.

Forney, A. J., Katell, S., Crentz, W. L., 1970a, High-B.t.u. Gas from Coal Via Gasification and Catalytic Methanation, Proceedings, American Power Conference, Vol. 32, pp. 428-434.

Forney, A. J., Gasior, S. J., Maynes, W. P., Katell, S., 1970b, A Process to make High-B.t.u. Gas from Coal, Bu. Mines Tech. Prog. Rep. 24, April, p.6.

Hottel, J. C., and others, 1971, New Energy Technology--Some Facts and Assessments, the MIT Press, Cambridge, Massachusetts.

Mills, G. Alex, 1970, Progress in Gasification - U.S. Bureau of Mines Presented, Third Synthetic Pipeline Gas Symposium, Am. Gas Assoc., Chicage, Illinois, November.

Mills, G. Alex, et. al., 1971, Fuel Management in an Environmental Age, Environmental Science and Technology, Vol. 5, January, pp. 30-38.

Office of Coal Research, Annual Report, 1972.

Oil Gasification

Cockerham, R. G., Percival, G., and Yarwood, T., The Catalytic Gasification of Petroleum Feedstocks, Research Communication GC 106, The Council (England), 1965.

Milner, J. J., Some Recent Developments in the Production of Rich Gas from Liquid Hydrocarbons, presented before the American Gas Association, Inc., Production Conference, Buffalo, New York, May 24, 1965.

Office of Coal Research, Annual Report, 1972.

Schultz, E. B., Linden, H. R., High-Pressure Hydrogasification of Petroleum Oils, Research Bulletin No. 29, Institute of Gas Technology, Chicago Inois, 1960.

Taylor, A. S., and Milner, G., Some Methods of Making Gas From Oil, paper presented to The Institute of Gas Engineers (England), March 1958.

Thompson, B. H., Majumdar, B,B,M and Conway, H. L., The Hydrogenation of Oils to Gaseous Hydrocarbons, Research Communication GC 122, The Gas Council (England), 1966.

Thompson, B. H., Majumdar, B. B., and Conway, H. L., Synethetic Natural Gas Can Boost Gas Supplies, The Oil and Gas Journal, September 13, 1971, pp. 78-79.

12. Reduction In Demand

a. Discussion of the Alternative

An alternative to the development of the oil and gas from the OCS sale could be to reduce the demand for energy so as to make the development of the oil and gas unnecessary.

There is a body of thought which is advocating the reduction in the use of energy on environmental grounds. McCloskey 1/ presents the basis of such a position and indicates the kind of public policies that would be required to implement the program. This includes the replacement of the market system to determine how much energy shall be produced or imported and who shall consume energy, with a detailed control on the production, importation, and use of energy in all sectors and regions of the economy. In his evaluations relative to controlling energy growth, he states:

> "A short-run strategy would involve the following changes in public policy: ending or reducing the many biases in public policies which provide incentives to energy growth; maintaining and strengthening environmental constraints on energy growth; reducing energy demands by educating the public to understand the importance of conservative use of energy; encouraging intensified research and development in order to achieve greater efficiencies in energy utilization and in order to find new, more environmentally acceptable, energy

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1/ Michael McCloskey, "The Energy Crisis: The Issues and A Proposed Response," Environmental Affairs, Vol. 1, No. 3, November 1971, pp. 587-605.

sources and discouraging growth in industries that are the most profligate consumers of energy. Coordination of these efforts would be facilitated through the establishment of new government agencies, specifically geared to respond to the energy problem. Each of these changes would involve efforts that would go well beyond the traditional bounds of energy policy, and all could have profound economic and social impacts. Yet changes are already beginning to occur in all these fields, and environmentalists are determined to promote them."

Donella H. Meadows, et. al., in a report for the Club of Rome's Project on the Predicament of Mankind 1/ presents an argument that the growth of our population and economy are pressing against a limit which will be upon us within the next century. The authors argue that action is needed now to reverse these trends and adjust the world economy to a steady state. They state, "These conclusions are so far reaching and raise so many questions for further study that we are quite frankly overwhelmed by the enormity of the job that must be done." 2/

The demand for energy in the United States has been increasing at an average rate of 3.1 percent annually for the last 20 years. Energy demand in the rest of the world has grown at a rate nearly double that

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1/ Donella H. Meadows, et. al., "The Limits to Growth", A Report for the Club of Rome's Project on the Predicament of Mankind, 1972.

2/ Ibid., p. 24.

of the United States in recent years 1/. Demand for petroleum increased by 5.7 percent per year from World War II to 1955, and then dropped almost to 3.6 percent per year through 1968 - or about the same as total energy demand in those years. 2/ But recently the rate of increase of petroleum demand has begun to rise again.

Energy demand has been closely correlated with gross national product, which, in turn, is closely correlated with both population and per capita income. The increasing use of energy, therefore, has been correlated with increasing affluence and a rising material standard of living. 3/ Furthermore, the emphasis being placed on improving air quality is further accentuating the demand for natural gas because its exhaust contains no sulphur and no particulates. During the last five years, demand for natural gas has exceeded the growth rate of demand for total energy. 4/

Reduction in demand through reduction in the growth of per capita consumption is possible. Bureau of the Census projections envision a 22% increase in per capita consumption by 1975, and a 65% increase by 1985, both relative to 1970. 5/ These growth rates could be lessened in two ways: (1) reducing

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1/ USDI, Bureau of Mines, Mineral Facts and Problems, 1970, Bulletin 650, Washington, D. C., Government Printing Office, p. 13.

2/ Ibid., p. 147.

3/ USDI, United States Energy: A Summary Review, 1972, pp. 2-5.

4/ Ibid., p. 34.

5/ Bureau of Census, "Population Estimates and Projection," 1970, Series No. 448, Aug. 6, 1970, Washington, D. C., Government Printing Office.

the rate of growth of demand for the goods and services which in turn would demand less energy, and (2) using energy more efficiently in producing goods and services. Growth rates could also be reduced by a reduced rate of population growth or stabilization of population at a given level.

Continued increases in material standard of living tend to be equated with increased number, variety, and size of objects which consume energy in their construction and operation: automobiles, aircraft, refrigerators, air conditioners, and the like. Transportation uses - primarily private automobiles - comprise 55 percent of current petroleum demand. 1/ Increases in size, performance and amenities (such as automotive air conditioning) increase fuel consumption. Reduction in the rate of growth of per capita energy demand - and especially of per capita petroleum demand - could result from a trend toward smaller cars and increased use of mass transit. Greatly increased use of air conditioning in recent years has contributed to the rapid growth of electrical energy consumption; increased use of insulation could reduce energy requirements for operation.

Substantial reductions in energy demand after 1980 could be achieved in the transportation sector. One model assumes the average weight of an American car (including imports) is about 3000 lbs., the average gasoline use is 13.9 miles/gallon and the average life is about 5 years. "On changing these numbers to 2000 lbs., 25 miles/gallon, and 10 years, and diverting 30% of the mileage to mass transit, maintaining production at the

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1/ USDI, Mineral Facts and Problems, op. cit.

replacement rate and utilizing recycled materials", a per capita saving of 1.1 kwht/hr (kilowatt hours thermal/hour) could be achieved in production and operation. 1/

Except for air and ship travel, mass transit is much more efficient in terms of energy consumption per passenger mile than the private passenger car. To transport one person one mile requires 1.47 kwht in a car with 2 passengers. The national average is 0.37 kwht/passenger mile for buses and 0.58 kwht/passenger mile for trains. 2/ A shift from the passenger car to transit by bus or train would help reduce current trends in energy consumption.

Other economies in energy consumption could be realized by discouraging use of electricity where substitutability permits. The increased use of electricity in heating homes has been a major factor in the growing demand for electricity and fossil fuel to generate it. Electrical power generation is only about 35% efficient and another 10% of generated power is lost in transmission. In contrast, oil fired home furnaces are about 65 to 85% efficient in generating heat. Better insulation could further reduce fuel consumption in homes. Solar heating and heat pumps for home heating require research and development but offer promising possibilities.

Another way to better match supply and demand for energy is through the price mechanism. In the past, use of natural air, water, and land resources has been virtually free. If a price were put on social costs

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1/ Makhijani, A. B. and A. J. Lichtenbery, "An Assessment of Energy and Materials Utilization in the USA", College of Engineering, University of California at Berkeley, Sept. 22, 1971.

2/ Ibid.

reflecting depletion of resources and damage to the environment, energy would tend to be produced in ways that conserve natural resources. Higher input prices would be passed on as higher output prices, which would reduce demand. This concept underlies such proposals as a tax on auto-emissions, which could be based on number of miles driven and a test on emissions for each vehicle. An auto tax would make it more expensive to drive a car and encourage use of mass transport. In addition, these taxes would provide incentive to develop cleaner technology.

If the costs of environmental and resource use were better reflected in prices of energy, more informed choices could be made. An electric rate schedule including higher charges for peak period usage would encourage consumers to shift use to other times of day, resulting in more efficient use of existing plant and less construction of new generating capacity to service peak demand.

Public awareness of energy conservation and alternatives would foster a clearer understanding of the energy implications of our decisions and way of life. A change in public attitudes toward walking, bicycling, mass transit, electric gadgets, disposable paper goods, bottles and cans, might do much to reduce demand for energy. It is our priorites and values that are responsible for the tremendous growth rate of energy demand. Standard of living does not have to be measured in the material terms that make up "affluence".

Research and development of more efficient methods of energy extraction and use offer long range possibilities for reduction in the amount of input needed to produce a given energy output. In this regard efforts should be directed toward development of total energy processes through which, for example, waste heat discharges could be used to run turbines, for preheating, drying and space heating. Other promising research areas include fuel cells, magnetohydrodynamics, and breeder reactors.

In absolute amounts, the growth of energy demand can be stabilized by controlling population growth. Pressure of world population on resources is already severe and fast approaching a limit beyond which drastic changes in our present way of life will take place.

Any consideration of reduction in demand must recognize the nature and magnitude of projected petroleum demand and natural gas demand and the impacts and adjustments that would have to be made to accommodate either a portion or the total of such reduction in any one of the sectors of use. Adequate evaluation of such effects could only be made after intensive study and analysis, which is far beyond what is now known or could be developed relative to the scope and timing of this report and its related decisions.

For illustrative purposes, the following table, using National Petroleum Council projections of future petroleum consumption by sectors for 1980 shows the relationships of reductions of 75,000 and 150,000 b/d relative to the projected consumption for each sector. 1/

1/ National Petroleum Council (NPC), Environmental Conservation, The Oil and Gas Industries, Vol. 2, Feb. 1972.

Sector	Consumption (million b/d) 1980	% Relationship to 75,000 b/d 1980	% Relationship to 150,000 b/d 1980
Transportation	11.774	0.6%	1.3%
Residential/Commercial	3.104	2.4%	4.8%
Industrial	2.256	3.3%	6.6%
Utilities	2.345	3.2%	6.4%
Petrochemical Feeds	1.586	4.7%	9.4%
Other	1.264	5.9%	11.8%
TOTAL	22.329	0.3%	0.7%

The transportation sector, which represents over half of the projected demand, would be the area most subject to major demand reductions, since such action would represent but 0.6 to 1.3 percent reduction in 1980.

A similar type of analysis would also have to be conducted for reduction in natural gas supply. The proposed OCS lease sale is projected to supply approximately 0.2 to 0.4 percent of total natural gas demand by 1985. An evaluation of reduction in demand for natural gas must take into account the present acute shortage of supply. Demand for natural gas is already under restraint due to a variety of controls, including regulatory limitations on new sales (including residential and commercial sales), voluntary restrictions on new sales adopted by gas companies, and the economic restraints inherent in rising retail prices for natural gas.

The expected natural gas production from this lease sale would not cause any growth or change in existing patterns of gas consumption. Several pipelines supplied by offshore Louisiana wells have been forced to curtail activities below contracted quantities by amounts in excess of the expected production of natural gas from the lease sale.

It may not be possible to reduce demand substantially before 1980 since a long lead time would exist between the public being sufficiently acquainted with the need to reduce demand, the actual initiation of a program and implementation of this program. For example, to convince Congress and the public of the need of reducing energy demand would be quite a monumental and time consuming task, since mass attitude changes are not effected quickly. Once this task is accomplished, the formidable task remains of selecting and instituting a program designed to reduce demand. It is not likely that this could all be accomplished prior to 1980.

b. Potential Environmental Impacts

If a reduction in demand were directed at the oil and natural gas to be developed from the proposed OCS oil and gas lease sale, all the environmental impacts associated with that development and energy use would be eliminated as a result of the direct tradeoff. It would also eliminate any environmental damages and any adverse results associated with any one of the alternatives to the sale.

A major consideration in restricting demand for energy services is that the cost involved in such a restriction is not related to the environ-

mental damage which would be prevented by not producing, transporting and consuming the energy resources involved. In the case where pollution standards are introduced and enforced, causing the amount of environmental damage to the air per unit of energy produced to decrease radically over the period of a few years, the environmental benefits of the action decline but the associated costs do not. Assume, for example, that energy demand is reduced by the energy equivalent of 75,000 to 150,000 barrels of crude oil per day, and this reduction is to be accomplished through a reduction in petroleum use in mobile equipment.

The following table shows the trend in quantities of air pollutants emitted from mobile equipment using petroleum products. 1/

Estimated Emissions From Mobile Equipment
(millions of tons per year)

	1955	1960	1965	1970	1975	1980	1985
Hydrocarbons							
Autos	9.9	12.0	13.0	11.0	5.9	2.4	0.9
Trucks	1.2	1.4	1.7	1.9	1.7	1.4	1.4
Aircraft	.3	.3	.2	.3	.2	.1	.1
Off-highway	.7	.7	.7	.6	.6	.6	.5
Total	12.1	14.1	15.6	13.8	8.4	4.5	2.9
Carbon monoxide							
Autos	37.3	45.7	55.2	54.3	40.6	24.3	12.7
Trucks & buses	11.1	12.7	15.6	17.4	16.2	14.0	14.2
Aircraft	2.2	1.4	.9	.4	.5	.7	.8
Off-highway	6.7	6.8	5.7	5.3	5.5	4.4	3.4
Total	55.3	66.6	77.4	77.4	62.8	43.3	31.1
Nitrogen oxide							
Autos	3.3	4.0	4.8	5.7	5.0	2.8	1.3
Trucks & buses	.8	.9	1.1	1.4	1.6	1.5	1.7
Aircraft	.01	.01	.03	.05	.06	.08	.09
Off-highway	.8	.9	.9	.9	.9	1.1	1.1
Total	4.9	5.8	6.8	8.1	7.6	5.5	4.2
Particulate							
Autos	.2	.2	.2	.3	.3	.2	.1
Trucks & buses	.1	.1	.1	.2	.2	.2	.2
Aircraft	.01	.01	.02	.04	.04	.04	.05
Off-highway	.2	.2	.2	.2	.2	.2	.1
Total	.5	.5	.5	.7	.7	.6	.5

The impact of the 1968 air pollution standards is quite apparent. It is also apparent from the table that the amount of air pollution which would be avoided by a reduction of petroleum use by 75,000 to 150,000 barrels per day would be much less if this reduction in use occurred in 1985 than

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1/ National Petroleum Council op.cit. p. 308.

if it occurred in 1965. Thus, the cost (measured in terms of energy services given up) per unit of pollution avoided would be greater in 1985 than in 1965. In general, this cost-benefit ratio of reduced energy services will vary considerably depending upon the existence, the level, and the effectiveness of pollution standards.

13. Combination of Alternatives

The attached table shows estimates of the production potential of the proposed lease sale, and the incremental production potential of alternatives considered in this volume. The table shows that several of the alternatives may have incremental potential equivalent to the estimated potential of the proposed lease sale, though not all would provide energy in directly substitutable forms.

It would clearly be possible to combine two or more alternatives so as to provide the energy equivalent of the oil and gas potential of the proposed sale. Considering the level of production of each alternative as a continuum, the number of such combinations is infinite; therefore specific combinations are not addressed.

The pattern of advantage and disadvantage of such combinations is, however, clear. Problems of substitutability of alternatives may be mitigated by some combinations. The economic and environmental advantages and disadvantages of each component of a combination would be qualitatively similar to that for the alternative as described elsewhere in this statement. The extent of the impact would depend upon the level of production of the alternative.

Environmental impact would also depend strongly upon siting. For example, current estimates are that economical production of shale oil would require a plant with a capacity approaching 100,000 barrels per day. Thus, if oil shale were exploited in combination with another alternative to replace the proposed lease sale, a single plant would be constructed; its impact would depend upon its location.

Comparison of Incremental Production Potential of Proposed Lease Sale and Alternatives 1/

Alternatives	1975 Physical Units		1975 mmb/de 2/	1980 Physical Units		1980 mmb/de 2/	1985 Physical Units		1985 mmb/de 2/
Proposed sale - oil	0.030-0.060 mmb/d	4/	0.030-0.060	0.075-0.150 mmb/d	3/	0.075-0.150	0.075-0.150 mmb/d	3/	0.075-0.150
· gas	80-160 mmcf/d	4/	0.014-0.028	200 - 400 mmcf/d	3/	0.036-0.071	200-400 mmcf/d	3/	0.036-0.071
			0.044-0.088			0.111-0.221			0.111-0.221
1. Imports									
a. Oil from Mideast	0.060 + mmb/d	5/	0.060 +	0.150 + mmb/d	5/	0.150 +	0.150 + mmb/d	5/	0.150 +
b. LNG	80 - 160 mmcf/d	6/	0.014-0.028	200 - 400 mmcf/d	6/	0.036-0.071	200-400 mmcf/d	6/	0.036-0.071
2. Onshore Prod.									
a. Econ. incentives	0.060 + mmb/d	5/	0.060 +	0.15 + mmb/d	5/	0.150 +	0.150 + mmb/d	5/	0.150 +
b. North Slope	None 7/		None	None 7/		None	None 7/		None
c. Expl. Fracturing	None		None	3 tcf/year	8/	1.462	3 tcf/year		1.462
3. Nuclear Power	None		None	5000-31000 Mw	5/	0.111-0.221	5000-31000 Mw	5/	0.111-0.221
4. Coal as Solid Fuel	4 - 8.4 mm sh.t.	5/	0.044-0.088	10-20.9 mm sh.t	5/	0.111-0.221	10-20.9 mm sh.t.	5/	0.111-0.221
5. Hydroelectric	None		None	None		None	None		None
6. Nat. Gas Pricing	?	9/	?	?	9/	?	?	9/	?
7. Modif. Prorationing	None		None	None		None	None		None
8. Oil Shale	None		None	0-0.35 mmb/d	10/	0-0.35	0-1.0 mmb/d	10/	0-1.0
9. Synthetic Gas									
a. Naphtha	?		?	?		?	?		?
b. Coal	None	11/	None	1240 mmcf/d	5/	0.221	1240 mmcf/d	5/	0.221
10. Reduced Demand	Various	5/	0.038	various		0.088	various	5/	0.088

1/ Quantitative estimates in text of impact statement, except as noted. Except in the case of the proposed sale, values shown are potential increments over currently anticipated production from these sources.

2/ Million barrels per day, equivalent. Equivalent used in the derivation: 1 bbl = 5620 cu. ft. of gas
(For derivation of these equivalents, see Appendix A to Volume III of "An Analysis of the Economic and Security Aspects of the Trans-Alaska Pipeline," U.S. Department of Interior, Washington, March 1972).
= 0.223 tons of coal
= 548 - 1700 kwh of electricity
= 0.04567 - 0.142 Mw of electric generating capacity

3/ In the sixth year after leasing, (taken to be 1972) here taken to be the level applicable to 1980 and 1985.

4/ Assuming production begins (1974) two years after lease 1972 and increases linearly to full potential in the sixth year (1978). Thus, 1975 production would be 40%.

5/ Assumed to be available in quantities at least equal to production for the proposed sale.

6/ Bureau of Mines estimates that "imported LNG could be a partial near-term alternative to the proposed lease sale but at a significant increase in the cost of gas to consumers."

7/ Alaskan oil will probably not flow before 1976, if then; in subsequent years production from Alaska will probably help to meet deficits on the West Coast rather than in markets served by the proposed lease sale.

8/ Assuming recovery at 1% of additional recoverable reserves per year.

9/ Indicates uncertainty: however, gas production might be stimulated to provide an increment of production equal to that of the proposed lease sale. Although gas is not fully substitutable for oil.

10/ From "An Analysis...", Vol. III, p. vi. (c.f.n. 2/).

11/ Only pilot plants will be operational by 1975.

Symbols:

mmb/d	----- million barrels per day
mmb/de	----- million barrels per day, equivalent
mmcf/d	----- million cubic feet per day
mm sh. t.	----- million short tons
tcf/year	----- trillion cubic feet per year
Mw	----- megawatts

C. Delay Sale Until New Technology is Available to Provide Increased Environmental Protection

The sale could be delayed until new technology is available; however, basically safe technology is available provided its application and use are properly regulated and controlled. As new technology relating to safety and environmental protection is developed, it can be incorporated with existing requirements and applied to all OCS leases so that bringing on additional production now will not generally preclude adaptation of new advances to the prospective leases. "Zero risk" does not exist but is an ideal toward which safety systems are directed. In the history of Federal offshore leasing and production over the past 18 years only 12 significant oil spills have occurred in more than 1,000 leases, 9,000 drill holes, and 1,800 producing platforms.

IX. Consultation and Coordination with Others

A. Consultation and Coordination in Preparation of Draft Environmental Statement

1. Federal:

In the preparation of the Draft Environmental Statement review comments have been solicitated from appropriate Bureaus and Offices within the Department of the Interior. In addition, the Environmental Protection Agency, the Department of Commerce, Department of Transportation, Atomic Energy Commission, Federal Power Commission and the Office of Emergency Preparedness have been consulted throughout the preparation phase of the environmental statement.

2. State:

In the preparation of the Draft Environmental Statement, advice was solicited from the appropriate offices of the following States: Louisiana, Alabama, Mississippi, Florida and Texas. Consultations were held with the States of Louisiana and Mississippi in New Orleans on March 7, 1972.

3. Public:

The testimony and comments resulting from a public hearing held in New Orleans, Louisiana on September 8 and 9, 1971, concerning the proposed OCS general oil and gas lease sale offshore Eastern Louisiana which was cancelled were considered. Since the area under consideration

for this environmental statement remains essentially the same as that of the cancelled sale the public hearing comments and testimony have been considered as applicable to the present proposed offering. Part B of this section contains a discussion of comments from witnesses opposed to the proposed lease sale and from expert witnesses of the offshore Operators Committee whose testimony directly concerned many of the environmental issues involved in the proposed sale.

An extensive section on possible alternatives to the proposed sale was developed after the public hearing and was included in a draft environmental statement which was made available to Federal, State and local agencies and to the public on March 31, 1972. Since that time, we have received substantial comments from industry representatives and conservation groups as well as State and Federal Government agencies concerning the alternatives section and the environmental statement as a whole. Part C of this section presents a summary of the review comments.

B. Some Problems and Objections Raised at a Public Hearing Concerning the Proposed Sale*

On September 8 and 9, 1971, the Bureau of Land Management conducted a public hearing in New Orleans concerning the proposed OCS lease sale. In all, 107 witnesses testified at the public hearing, of whom the vast majority, including those commercial and sport fishermen, and State and local officials present, testified in favor of the proposed lease sale. Comments of several witnesses who testified in opposition to the proposed lease sale are discussed as follows:

1. New Orleans Audubon Society

Dr. Donald G. Schueler testified that the conclusions reached in the environmental statement, give a "green light" to hold the sale while the substance of the Environmental Statement seems to cry out for the opposite conclusion. He sees a contradiction in the evidence and overall message of the statement and the conclusions reached.

Since the long-term effects and consequences of oil production are not known precisely, and the impact of pipeline installations on marsh lands is destructive, he feels this should lead to a conclusion which would delay the sale.

Recommends:

1. Require that all pipelines be buried in the marshes rather than to allow canals to be dug.

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* Public hearing testimony and evidence submitted by witnesses are on file and available for inspection in the Division of Marine Minerals, Bureau of Land Management, Washington, D. C.

2. Better means of cleaning up oil spills must be devised before sales are held.

3. Better studies of the effects of oil pollution must be completed prior to giving sales the green light.

4. Lease those tracts classified 1 and 3, but on condition that industry guarantee to bury their pipelines in marsh lands; to agree to bury all other pipelines they own within a period of 5 years; and, to fire the man in charge of any oil rig who is caught in more than one willful or negligent violation of the laws controlling oil pollution.

5. Sell those tracts in #5 category only when after two years of govt. surveillance and unannounced inspections, it is proved that oil spills have decreased in both volume and number by 60% from those occurring in the first half of 1971.

6. Tracts classified #7 should never be sold.

7. Until all of the above conditions are agreed to, the sale should be delayed.

2. Houston Sportman's Club

The Sportman's Club spokesman recommended that exploration and extraction be allowed in areas beyond the six fathom (36 ft.) mark and that all permits be denied in waters that are six fathoms or less.

He also recommended that stricter rules of operation be set up by the Department of the Interior that will protect our Gulf beaches and all the marine life in the Gulf and its appendages.

The spokesman stated that the guidelines for the six fathom depth were studies by the Corps of Engineers on wave harmonics and underwater waves and the Club's own deduction of what the results would be in interpretation of the studies. He indicated that water depth limit, as opposed to other limiting criteria, is used because, generally, in the Gulf of Mexico, at that depth you're out about seven or eight miles from shore, and that this gives plenty of free room for the oil industry to come in and clean up any spills that may occur.

This relationship between water depth and distance from shore, as expressed, is not constant, however, throughout the Gulf of Mexico. Near the Mississippi delta, the six fathom isobath occurs within one mile from shore in some areas.

3. Sierra Club (National)

Concern was expressed over the land use required by power plants and transmission lines and it was estimated that transmission lines alone could, in twenty years, require land space equal to twice the size of Delaware.

Comments on the inadequacy of the alternative section of the draft statement and the lack of any discussion on present levels of Federal funding for research and development on alternative clean energy sources were raised.

Recommends cancellation of the lease sale on the basis that present and projected energy requirements are overestimated and that significant hazards to a major estuarine, coastal, and marine environment would be increased by the proposed sale. Further recommendations, if the sale is not cancelled are:

1. Tracts outlined as carrying a high environmental risk should be withdrawn.
2. Pipeline laying, if it occurs, should be done by methods not requiring concomitant canals.
3. Pipelines should be backfilled, and measures taken to reverse damages which are presently occurring because of pipelines and access canals.
4. Stringent safeguards outlined in the draft statement should be strictly enforced and updated as techniques improve.

4. Perdido River Basin (Alabama) Anti-Pollution Association

Requests that approval of the entire lease sale be denied and that until it can be proved that oil production can be accomplished without endangering the environment, an indefinite drilling moratorium be placed on all oil leases in existence at this time, on the submerged lands and coastal waters, and in the Gulf of Mexico.

5. Council on Environmental Issues, Louisiana State University

Mr. Will Pozzi commented that he was principally concerned about the effect of a possible oil spill on the marsh grasses (Spartina sp.) which form the basic foundation for the marsh/estuarine food chain. He stated that an oil contamination study on a similar species of marsh grass showed damaging effects from small continuous applications and single large applications of oil.

A further comment expressed concern over the effects of dredging and erosion on the marsh grasses and the migratory patterns of oyster larvae and shrimp.

Mr. Pozzi recommended that on the basis of data he presented, which reveals the lack of known data on alterations presently occurring, leasing be postponed indefinitely until an adequate environmental impact study has been undertaken to consider these areas. He expressed particular concern in regard to the following blocks: South Pass - 32, 33, 34-35, 46, 47, 48, 49, 51, 52 and 53. (Subsequent to the preparation of the Final Environmental Statement, South Pass Blocks 32, 33, 34-35 and 73; and Main Pass Blocks 73, 147, 148 and 151 were withdrawn from the proposed offering.)

6. Sierra Club (Baton Rouge)

Dr. John W. Day testified that all of Louisiana's major commercially sought fishery species, spend all or portions of their life cycle in estuaries and salt marshes and that a reduction in salt

marsh acreage, which is presently occurring according to data he presented, will result in decreased productivity of the estuarine areas.

He stated that there has been an increase in the total amount of fishereies in the past several years, but that the catch per unit of effort has been decreasing.

He offered several methods for conserving energy and suggests that in light of these facts, all of the blocks in the proposed sale are not needed and that some be saved for later development.

He opposed leasing of those blocks which pose a high risk to estuarine and marsh areas and commercial fisheries, and the leasing of tracts which would necessitate the building of new pipelines across marshlands.

7. Offshore Operators Committee

The Offshore Operators Committee (OOC) is an organization composed of 50 operators who have 95 percent of the production now being obtained from the offshore waters of Louisiana and Texas. Portions of the OOC testimony are included here because they specifically address some of the information presented in the draft statement and because expert witnesses produced by OOC rendered testimony in regard to many of the environmental issues involved in the proposed sale.

OOC comments take exception to several points presented in the draft environmental statement which will be discussed on an item by item basis.

(1) OOC states, that, "As set forth in the testimony of Dr. Mackin, it can be safely asserted that the environmental risk from oil on the water, the shore and in the marshes has been highly overrated."

(1a) The word "overrated" is non-quantitative. The statement forms an opinion which is supported by some, but not all of the scientists who testified.

(2) The second point raised is that "distance from the shoreline should not be the sole criterion of assuming the risk factor. That prevailing winds, deep currents, surface currents and tidal movement are all factors to be considered, and these introduce such variables into a particular situation at a particular location on a day or hour that the assignment of a risk factor from an OCS tract to a particular site can only be arbitrary. Actually, the preponderant combination of these variables is such that the normal movement of an oil spill on the surface of the water is parallel to, or away from the shore." 1/

(2a) The statement that the distance from the shoreline is the sole criterion in the risk ranking index is

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1/ K. L. Drennan, 1963; D. F. Leipper, 1954; G. B. Austin, 1955, and U. S. Naval Oceanographic Office, Tides and Currents, 1965.

incomplete. The ranking index also assumes a transporting medium (water) and other factors (wind and currents) which influence the transporting medium.

The nearshore portion of the sale area is of most concern because of the extreme variability of currents and winds there, and because, as Dr. Mackin points out in his testimony "concentrations of oil from spills are greater." Another witness, Dr. Straughan, in reference to the significance of tracts in deeper water, indicated that "one could generally expect less effect from an accidental oil spill in these depths and distances from shore than from a spill in shallow inshore waters."

The ranking index is "arbitrary," but ranking methodologies are standard and accepted tools with which decision-makers array data in an attempt to rationally deal with complex problems. Until such time as a better method is presented, it offers a starting point.

The report by Scruton, Humphreys and Abbot, which is discussed in the final statement in section II.D., does not support the contention that "the normal movement of an oil spill on the surface of the

water is parallel to, or away from the shore." That oil can actually reach the shore, appears to be correct according to Scruton's study, which indicates extreme variability in the area, despite resultant trends.

The first witness of OOC, Mr. R. W. Bybee, Humble Oil and Refining Company, discussed, among other things, some of the geologic conditions as they affect safety and protection from environmental pollution. He stated that surface and subsurface faults, abnormal pressures and mud slides and unstable bottom sediments are potential problems in the area, but due to current technologies these conditions no longer present the hazard to safety or to the environment that they have in the past.

A question unanswered in the draft statement, concerned the ultimate destination and use of the Louisiana low-sulphur oil. Mr. Bybee guessed that a very substantial amount of it would be used in the U. S. and he knew of no plans to export any large amounts of it, now or in the future.

In response to a question on the sulphur content of Louisiana crude, Mr. Bybee later provided an analysis showing the sulphur content of Louisiana crude to be 0.34% by weight, compared to a sulphur content of 0.74% by weight for a sample of Santa Barbara crude oil.

A second witness, Mr. J. W. Pittman of the Shell Oil Company, offered testimony on several points, including multiple-use of the offshore

area. He stated that underwater stubs had been a source of irritation between the oil industry and the shrimpers and that 123 such stubs had been removed in the past year with another 30 scheduled for removal within the next 60 days, leaving approximately 93.

Commenting on the OOC testimony, Mr. Waldo Orrson of the Louisiana Shrimper Association provided different figures (personal communication) indicating that as of August 31, 1970, there were 185 stubs requiring removal and by August 31, 1971, 117 stubs remained.

Another witness representing OOC, Dr. John G. Mackin, testified extensively on present and past environmental conditions in the northern Gulf of Mexico, with particular references to any known effects of oil pollution. Based on his personal knowledge of the area, and several scientific studies he has conducted, Dr. Mackin offered an opinion that, "since oil spills in shallow, confined waters cannot materially affect marine communities, one has little to fear from spills in offshore waters."

Dr. Mackin's full testimony and answers to questions from panel members is on file, along with specific comments from Dr. Max Blumer, on certain points or issues raised at the hearing.

The final OOC witness, Dr. Isdale M. Straughan, largely confined her remarks to a study she conducted following the Santa Barbara Channel oil spill in 1969. Dr. Straughan stated that the report of the study,

and reports of other independent studies, found that the biological damage was much less than predicted immediately after the spill and the area is recovering.

Dr. Straughan's testimony and answers to questions from panel members is on file, along wtih copies of the two volume report on the Santa Barbara oil spill.

C. Coordination and Review of the Draft Environmental Statement

The following presents a list of all organizations and agencies from whom review comments were received. Where appropriate, the disposition of their comments and any unresolved conflicts is also indicated. All comments received are attached as part of this Final Environmental Statement.

1. Federal Agencies

a. Bureau of Sport Fisheries and Wildlife (BSF&W)

The review comments prepared by the Bureau of Sport Fisheries and Wildlife were very thorough, essentially constructive and extremely helpful in improving the information presented in the Environmental Statement. All of their specific comments have been incorporated into the main body of the Final Environmental Statement with the exception of the following:

We have not included a discussion of support functions because, although issuance of the leases would have an impact on support functions, it would only tend to raise the level of these activities to the level of several years ago. For example, during 1967-68 about 85-90 drilling rigs were active offshore Louisiana at any given time, but during the last year (1971) this average had dropped to 75-80 and had dipped as low as 70.

In addition, sufficient navigational channels have been developed to service the offshore area. Storage and refining facilities have sufficient excess capacity due to declining onshore production to handle increased production from the OCS.

If additional facilities of this type are needed industry has advised that they would expand existing sites with minimal environmental impact. Additional geophysical surveys would be necessary, causing some increase in boat traffic in certain areas. Current geophysical techniques generally however are not harmful to marine life and this type of activity would stimulate the local economy. Additional socio-economic data is included in the section on positive impacts of the proposed lease sale.

All comments regarding the alternative section were incorporated in the statement except for the following:

Page 101, paragraph 1*- If shortages result on account of the sale not being held, prices should rise and demand should go down due to its elasticity.

Page 101, paragraph 2- The 5-15 year period represents the years of maximum production.

Page 101, paragraph 3 - Oil shale has been included because two pilot plants will be in operation during the period of concern.

Page 102, paragraph 1 and 2 - Same as above.

Page 130, paragraph 2, last sentence. All OCS pipelines have this equipment where pipelines originate, terminate on a platform, or cross a platform.

Page 159, last sentence - There is no material to support this insertion.

Page 202, last line - There are no facts which would support this insertion.

*All page numbers refer to the Draft Environmental Statement.

b. Atomic Energy Commission

Section III B discusses the positive impacts or benefits of the proposed action and Section III C of the statement contains an analysis of the environmental risks of the proposal. In addition, each reasonably available energy alternative described in the statement contains a discussion of the environmental impact of that alternative. We are constantly trying to improve our methods of evaluating the potential risk that offshore oil and gas development poses to the complex marine environment together with the benefits that might result. With regard to the former, a description of the BLM oil pollution study team has been included in Section III A. 4. and with regard to the latter, a section on the positive impact of the proposal has been included in Section III B.

c. Bureau of Outdoor Recreation

The Bureau of Outdoor Recreation asserts that the statement presents no short term strategy for meeting domestic energy demand and also excludes the possibility of multiple use solutions. A section on combination of alternatives has been added to the statement and can be found in Section VIII. B. 13.

d. National Park Service

All the comments and suggestions made were incorporated into the statement. The results of consulting the Federal Register of Historic Places, surveys of OCS, and archeological values, are in Section II. I.

The other comments from one to four were also used to revise the sentences to which they applied.

e. Department of Commerce

All the comments and suggestions made were incorporated into the statement except the last one concerning National Marine Fisheries Service (NMFS). It is felt that, although NMFS has responsibilities with respect to marine, estuarine, and anadromous fishery resources, this listing is meant to include just those organizations that would have responsibility for the actual leasing, construction, and operation of pipelines. It would be expected that the NMFS would have the opportunity to provide inputs in review of Corps of Engineers permit applications and in preparation of environmental statements concerning a proposed pipeline project.

The Oil and Gas Supervisor of the Geological Survey is a member of the Gulf Coast Marine Fisheries Committee and, as explained in Section V. C of the Statement, does have the opportunity to coordinate with the NMFS concerning the placement of offshore platforms.

The comments of the NMFS, attached to the letter from the Department of Commerce, are included as part of the record even though the comments are applicable to an earlier environmental statement which was prepared by us last year. Since that time, we have substantially expanded the section on oil pollution studies. Also, concerning the issue of deeper water fishing, we were informed by NMFS in a meeting on Feb. 29, 1972 that conventional shallow water fishing has peaked and thus, if the industry is to grow it will eventually be expected to move seaward into deeper waters.

f. Bureau of Mines

The Bureau of Mines made several suggestions and provided additional data on the alternative section. Specifically they suggested that:

(1) Alternative 1 be expanded to increased imports of oil, natural gas, liquefied natural gas, and petroleum products. A discussion of Canadian gas imports has been included in alternative 1 and a separate discussion has been made of liquefied natural gas.

(2) Alternative 2 be expanded to "increased onshore oil and gas production, including fluid injection, explosive fracturing, and production from tar sands and heavy oil deposits". Fluid injection or other forms of secondary recovery were not added in that these processes are already being done and cannot be considered as energy alternatives. A section on nuclear stimulation has been added. Tar sands and heavy oil deposits were not considered to be short term alternatives that could serve as substitutes to the proposed sale.

(3) Add "synthetic gas from naphtha, LPG and coal" as our alternative. This has been done.

Data was provided on the above points and has been incorporated in the statement to the extent possible.

g. Federal Power Commission

The Federal Power Commission provided useful information as to actions being undertaken to increase gas supplies. This information has been incorporated into the statement to the extent possible.

h. Environmental Protection Agency

General Comments -

Factors such as water depths, proximity to shipping lanes, and areas of unstable bottom sediments are examined in the statement particularly as they relate to the need for special stipulations concerning the development of specific tracts. Moreover, of a total of 3 million acres nominated for this sale only 396,250 acres were originally selected for offering and this was again cut to 366,440 acres due to the withdrawal of eight tracts of high environmental risk. Consequently, of those tracts nominated only those which have the highest geological potential and lowest environmental risk are selected. The 78 tracts proposed for this lease offering have been examined throughout this statement, and, based on the potential risk level along with implementation of special stipulations listed, are not considered to pose a level of risk sufficient to justify their withdrawal from the proposed lease sale.

Specific Comments -

(1) The 300,000-600,000 acre range for sales has proved satisfactory in helping to meet the Department's three primary factors: orderly resource development, protection of the environment, and receipt of fair market value. However, in view of the rapidly changing energy picture, the Department is currently reviewing both the size and frequency of OCS lease sales. Dependant upon the Department's findings, an updated five-year schedule may follow different guidelines with respect to size and frequency of sales.

(2) The commercial fishing statistics have been updated by the

Bureau of Sport Fisheries and Wildlife (BSF&W) 1971 data.

(3) Shellfish are included in the category of commercial fishing. Platforms have a negative aesthetic effect of being viewed from a beach.

(4) To date there have been no reported spills of polychlorinated biphenyls (PCB) or, for that matter, any biphenyls in OCS waters. Heat exchangers are not commonly used on offshore platforms. There are, however, a few types occasionally in use (e.g., brine bath and gas to gas exchangers). The probability of any spill over five or six barrels of biphenyls into OCS waters is considered extremely remote.

Section III. A. 1. discusses disposal of solids such as trash or other debris. However, if by "waste solids disposal" EPA means sewage then OCS Order No. 8 prescribes sewage treatment standards and specifications as follows:

> ". . .effluent shall contain 50 ppm or less of suspended solids, and shall have a minimum cholrine residual of 1.0 mg/liter after a minimum retention time of fifteen minutes".

The Geological Survey has received some data on produced brine water but information is incomplete. Offshore brines thus far documented are similar in nature to onshore brines. Concentration of total dissolved solids in offshore brine samples ranges from 61,0000 to 270,000 ppm with an average of about 140,000 ppm.

(5) Records from the Geological Survey indicate that approximately 2,320,000 bbl. per day of effluent water are released into State waters from production operations there (zones 0 and 1 only). Accurate data are not yet available that would allow determination of oil concentration in these waters.

When it is determined that technology is available to accomplish oil separation from effluent water at a more efficient rate, OCS Orders will be revise to establish specifications for this problem.

(6) The 0.5 knot value represents an estimate of the shoreward componen of current velocities common to the area. This has been added in a footnote on page 79 as a point of clarification.

(7) See section III. D. of statement concerning expanded discussion of unstable bottom sediments.

(8) The areas where these stipulations are to be enforced have been identified and any structure proposed by the lessee will be analyzed as to its need for proper exploration, development and production of the lease. The purpose of this stipulation is to limit the number of structures in a given area. Therefore, as this minimum number can only be determined by an engineering and geological analysis of the lease, the Conservation Division staff of the Geological Survey is best qualified to make this determination. It is assumed that all locations in these identified areas would have the same impact on commercial fishing operations.

(9) Criteria used for determining the practicability of deploying oil containment and cleanup equipment includes amount, and duration of the spill, prevailing weather conditions at the time, and probability of damage to critical area. It is therefore impractical to present specified criteria for such deployment, e.g., a spill of 100 barrels of oil occurring at the

rate of 10 barrels per day in the open sea and being dispersed by wave action would not lend itself to containment as would be a batch spill of 100 barrels of oil in a calm sea close to the shoreline.

(10) This sentence has been deleted.

(11) The term frequent in this case was used to mean that inspections are to be made at least once every 48 hours. However, these facilities are generally checked daily.

(12) The authorization and circumstances for use of chemical dispersants are cited in paragraphs 2005, 2006 and 2007 on pages X-2 and X-3 of the National Oil and Hazardous Substances Pollution Contingency Plan. The authorization is by the "On-Scene-Coordinator" and the type of oil, size of spill, water depth, etc. are specified in paragraphs 2006.1-2006.7.

(13) The emphasis of "at least one time" may be misleading as to normal number of drilling inspections. From the write-up on the following page of the same paragraph it is apparent that with 631 drilling inspections and approximately 80 rigs in operation the average is about 8 inspections per rig. Many wells which are inspected one time are completed before it is possible or practical to make another inspection trip to that location.

(14) The Bureau of Land Management has initiated a study of pipeline needs, methods of construction and installation, etc. and preliminary results of this ongoing study are reflected in the discussion in Section III.A.3 and V.B.

The comment on p. 324, Department of Commerce also applies here.

(15) There is no evidence at this time to support the contention that "long-term productivity of fish and wildlife in the area may be reduced due to pollution resulting from the lease sale". The factual situation offshore Louisiana indicates that despite offshore oil and gas production since the 1940's and despite oil pollution incidences, both natural seepage and man-caused, fishery catches have continued to increase and wildlife have continued to flourish. The issue of long-term effects of oil pollution on fish and wildlife, as indicated in the Statement, is an issue for which we are continually trying to generate quality data.

(16) The sentence referred to has been rewritten

(17) Our response to "General Comments" above applies here as well.

i. Department of Transportation

U. S. Coast Guard

The change recommended by the Office of Pipeline Safety has been made (p. 111).

j. Office of Emergency Preparedness

The OEP notes the consultation and coordination with the Department of the Interior in preparation of the environmental statement.

k. Council of Economic Advisers

This agency reviewed the Environmental Statement but had no specific changes to recommend.

1. Geological Survey

No changes were recommended by this agency concerning revision of the environmental statement.

2. State Agencies

a. State of Louisiana, Wildlife and Fisheries Commission

The following is a reply to the comments made by the Wildlife and Fisheries Commission.

(1) The problem of underwater stubs is addressed in Section IV. A. 6. and IX. B. In addition, it should be pointed out that oil companies are not required by current OCS operating regulations to remove underwater stubs of exploratory wells if they intend to install a platform and produce from the well in the foreseeable future. Thus, at the present rate of exploration activity it can be expected that there will always be roughly 100 underwater stubs at any one time on the Outer Continental Shelf offshore Louisiana.

(2) It is true that at the present time, technical problems and economic considerations prevent burial of pipelines when constructed in water depths of more than 200 feet. However, the following facts should be mentioned:

(a) The pipeline industry is currently engaged in developing a feasible technique for pipeline burial in water depths greater than 200 feet.

(b) Pipeline and valves for underwater use are currently designed to present little or no obstruction to trawlers

(c) The majority of pipelines eventually bury themselves by sinking into unconsolidated sediments.

(d) There is a continuing liaison with the fishing industry to alleviate difficulties wherever possible.

(3) At this time it is not considered to be administratively feasible to place one pollution enforcement officer on each manned platform. We feel that a mobile team of inspectors can visit platforms with sufficient frequency to ensure compliance with housekeeping regulations, and to ensure that fail-safe devices are in working order. As pointed out in Section IV. D. 2., approximately 50% of the 1971 inspections were unannounced.

b. State of Louisiana, Department of Conservation

This state agency advises that Louisiana's ability to supply additional oil to satisfy necessary energy needs is almost nonexistent. They believe that improvements in technology and the stricter enforcement of safety rules and regulations have eliminated the pollution of the environment to a practical minimum. In their opinion, the alternatives to the lease sale are only in the distant future and do not really apply to the immediate solution. They believe the proposed lease sale cannot be delayed if we are going to start solving the energy dilemma.

c. State of Texas

1. Division of Planning Coordination reviewed the draft.

2. Department of Parks and Wildlife is concerned that we have not evaluated the possibility of oil spills from this sale reaching the Texas Coast. The tracts closest to the Texas Coast proposed in this offering are 100 to 150 miles from the Texas Coast and, therefore, are not considered to pose a risk to that area. It is also contended that the discussion of brine water is inadequate. Our reply to EPA's question No. 4 also applies here.

3. Texas Water Quality Board reviewed the draft statement and made no suggested changes.

d. State of Mississippi, Office of the Governor

The Office of the Governor of Mississippi indicates that the Environmental Statement adequately meets the requirements of the National Environmental Policy Act. No specific changes were recommended.

e. State of Mississippi, Board of Water Commissioners

This agency considers the Environmental Statement to be "adequate in both form and substance for the project proposal".

f. Gulf Regional Planning Commission, Gulfport, Mississippi

This agency finds the Environmental Statement to be "acceptable".

g. State of Mississippi, Office of the Attorney General

No comments concerning revision of the Environmental Statement.

h. State of Mississippi, Department of Archives and History

This office notes that the proposed OCS lease sale "would have no dominant adverse effect on historical or archaeological properties".

i. State of Mississippi, State Board of Health

No comments concerning revision of the Environmental Statement.

j. State of Mississippi, Mississippi Geological, Economic and Topographical Survey

This office had no comments concerning the Environmental Statement

3. Other Comments

a. Associated Gas Distributors

Considerable information concerning the discussion on alternative energy sources was provided by this incorporated group of public utility companies engaged in the distribution of natural gas. Much of this has been incorporated into the statement.

b. Texas Gas Transmission Corporation

This company does not believe the present tentative five year leasing schedule is adequate to meet short term energy demand.

In reply to their specific comments:

Comment #I. Table on page 15

The negative impact of platforms on beaches, national parks, and recreation areas is an esthetic one. Sometimes there is a negative impact on commercial fishing because of the difficulty encountered in maneuvering a fish trawl around a platform, thus cutting off some areas that can be fished. The negative impact of platforms on shipping is due to the feeling that the hazard to navigation outweighs the aid to navigation.

The negative impact of pipeline construction on fishing is indirect. This impact is felt when pipelines are constructed in nursery areas where harm to the eggs, larvae, and juveniles of a species can result.

The positive impact of platform, pipeline construction and storage facilities is discussed in Section III B.

Comment II-IV. Contain supplemental information on pipeline corridors, gas reserve and prorationing. The discrepancies noted in Comment #III have been corrected in the body of the statement.

c. Tilford A. Jones Attorney at Law for United Distribution Companies

The suggestions and comments of this organization were in the form of additions to sections of the draft statement. Since these comments will be attached to this environmental statement they will not be included as additions to sections in the body of the statement.

d. Atlantic Richfield Company

The disposition of Atlantic Richfield's comments is as follows:

Comment #1 The Table of Contents for the Alternatives Section has been revied to reflect the extent to which the alternatives were discussed. It is very similar to the one Atlantic Richfield recommended.

Comment #2 It is felt that the table on page 15 is not misleading as to whether the impacts are temporary or if some impacts can be both negative and positive. The table is just a summary of whether the impact will be negative or positive. It does not intend to tell how permanent or temporary the impact will be. It was not intended to give the degree of negative and positive impact of each factor.

Comment #3 These numbers on page 44 and page 81 were meant to give two different statistics. The 8,840 number is the total number of all completions as of January 1972 while the 8,789 number is the number of completions excluding service wells as of December 1971. This has also been clarified in the statement.

omment #4 The same paragraph on this page states that the structure would be removed when production ceases. It is therefore, understood that the adverse effect would also be removed.

The other comments (5-9) were incorporated into the statement.

e. Humble Oil and Refining Company

This organization feels the draft statement is adequate and the oposed lease sale should be held as soon as possible.

f. The Louisiana Land and Exploration Company

This organization is in favor of the proposed leasing sale. They so mention that the alternatives listed are either "unavailable in sufficient antities or are economically unjustified or environmentally inferior under esent technology".

g. Skelly Oil Company

This company supports the OCS leasing program and urges that the ntative five-year leasing schedule be carried out.

ey also give some general comments on the different sections of the draft vironmental impact statement.

h. Cities Service Oil Company

This company urges the proposed lease sale be held and that other les follow a regular schedule.

i. National Public Lands Task Force (Nevada Outdoor Recreation, Assoc.)

This organization presents arguments against the proposed lease le. The statistics concerning oil spills cited in their comments are in eral agreement with those contained in the statement. Increased inspections

and reporting requirements and procedures have increased the number of pollution incidences reported. In the past, numerous minor spills were not reported. (See Section IV. E.)

The National Public Lands Task Force states that the "quality of fish is on the decline--and there have been massive fish kills and destruction of vital oyster beds (in the Gulf of Mexico)." There is no evidence that we know of to support this claim. In fact, the commercial fishing industry in the area is breaking records in both vlaue of catches and amounts harvested (see Section II. G. of Statement). It does appear, however, that there has been a decline in oyster fishing, but this may be attributable to encroachment of estuarine areas, local conditions, etc. It is not attributable to oil and gas development on the Outer Continental Shelf because oysters are not in the deeper waters of the Outer Continental Shelf.

j. Shell Oil Company

This company supports the proposed five-year leasing schedule, believes technology relating to safety and environmental protection is presently available and feels there is no justification for further lease sale delays.

In reference to the table on page 15, they feel that the table is misleading for several reasons. This table was not meant to be a detailed analysis, but a general summary of positive or negative affect to the natural and human environment by different factors. As for the "plus" to the regional economy because of work on pipelines, platforms and buildings, this is discussed in Section III. B. We feel that it is not misleading in that its objective is only to let the reader know how a factor may affect the environment.

In reference to Section II. E, they recommend "that the discussion be limited to only those resources that could reasonably be expected to be affected by the sale". The resources mentioned are pertinent in that an overall picture of the area is necessary to evaluate the area that may be directly affected.

In reference to Section II. G. 1. that we should discuss the affect of platforms on sport fishing, a discussion of this nature is in Section III B.

In reference to their comments on Section III. A. 4 of the draft statement:

> Dr. Straughan and Dr. Blumer have been consulted and both feel we have adequately and fairly treated the results of their research.
>
> World War II tanker sinkings: We cannot determine the extent or lack of ecological damage by the oil and fuels spilled during World War II in the Gulf. This is due to the complexity of the situation (different types of oil and fuel; kind, amount and rate of burning of fuel and oil; actual leakage and rate of leakage of fuel and oil from sunken vessels is unknown, etc.), and the lack of scientific or expert data taken by the use of methods which employ controls and objective measurements.

Shell also includes general comments on several of the alternatives discussed in the statement and concludes with the recommendation that the sale be held at the earliest possible date.

k. **Getty Oil Company**

This company has made two comments about passages in the Statement. We acknowledge that, for the most part, Louisiana's beaches are inaccessible by road. We still feel, however, that a spill in the Grande Isle area would pose a small but real threat to the Grande Isle Recreation Area beaches. In addition, it is possible that other beaches may be made more accessible by additional road construction during the life of the leases.

We have briefly acknowledged in section VIII B. 1. a. that increasing imports might adversely affect national security and balance of payments.

1. National Resources Defense Council, Inc. (NRDC)

The NRDC believes the Bureau of Land Management, in preparing the draft statement, has "(1) failed to follow procedures required by the National Environmental Policy Act (NEPA), (2) inadequately discussed the environmental impact of the proposed action, and (3) omitted or inadequately discussed reasonable alternatives to the proposed action and its environmental impacts". Each of these issues is discussed below:

1) Failure to follow NEPA procedures

a) Lack of additional public hearing - The Bureau does not believe another public hearing concerning the proposed sale is necessary. This is discussed in section IX. A. of the statement.

b) Failure to consult about alternatives to the proposed action - The Bureau consulted and coordinated with appropriate Bureaus and Offices within the Department as well as other Federal agencies having jurisdiction by law or special expertise with respect to the environmental impact of the proposed action in preparation of the alternative section of this statement. In addition, we have sought the comments and views of appropriate State agencies authorized to develop and enforce environmental standards. The agencies consulted are included in section IX. A. of this statement.

In instances when the implementation of an alternative was considered to be outside the Department's authority, consultation with the responsible agency is specifically noted within the discussion of the alternative.

2) Inadequate discussion of environmental impact.

a) Overdrilling - Although the term "overdrilling" is not defined by NRDC it is thought that they are referring to a situation that would lead to the completion of more wells in a reservoir than would be necessary to deliver production at the maximum efficient rate (MER) of that reservoir. As outlined in section IV. I. of this statement, the Supervisor (GS) has authority to prevent over-drilling in the interests of sound conservation practices.

The average drilling costs for an average well of 10,300 ft. depth offshore Louisiana is $555,000. This cost factor mitigates against the practicality of overdrilling. In addition, through the December 1970 OCS lease sale, 1588 leases were issued. Of these leases approximately 14% or 228 leases were terminated or relinquished without any drilling operations at all. It can be surmised that some of this acreage was not developed due to the high cost of drilling.

Under the former system of production allowables, which were related to market demand and economic development cost, it may have been advantageous to overdrill for

higher production allowables and quicker return of investment. However, no such incentive exists for overdrilling under the present system of maximum production rates set by OCS Order No. 11 at daily rates not to exceed the Maximum Efficient Rate (MER) for the reservior. The MER is the reservoir rate which if exceeded would lead to avoidable underground waste through loss of ultimate recovery from the reservoir. Thus, with no economic advantage (i.e., high development cost with the average development well expense in excess of 1/2 million dollars), it is now unlikely that any lessee would undertake overdrilling a tract.

b) Enforcement - This section of the statement has been substantially expanded in response to the issues raised by NRDC.

c) Oil Spills - The oil pollution section also has been substantially expanded in response to NRDC's and other reviewer's comments.

d) Environmentally Hazardous Areas - Recent high resolution geophysical data of the area of unstable sediments has been included in Section III. C. of the statement together with an expanded discussion of the area.

3) Omitted or inadequately discussed alternatives to the proposed sale.

a) Definition of Purpose of Proposed Sale - A definition of low-sulphur fuel is included concerning sulphur content

of oil offshore Louisiana in section I. B. of the statement. The principal purpose of the proposed sale is not to provide low-sulphur fuel, but to help meet part of the nation's energy needs.

b) Delay sale - A wide-range of oil pollution studies are discussed in section III. A. 4. of the statement including a discussion of the Bureau of Land Management's planned oil pollution study team.

c) Hold Sale in Modified Form - Section VIII. A. includes the possibility of offering only those tracts estimated to be gas producing.

d) Increased Oil Imports - NRDC Asserts that the statement should discuss methods for providing incentives for increased supplies of oil from secure areas in the Western Hemisphere and should have a more detailed discussion of the issue of national security. These issues are treated extensively in The Oil Import Question.

NRDC asserts that we have not consulted with the Oil Policy Committee. The Interior Department has consulted with the Oil Policy Committee working groups and has incorporated their suggestions to the extent possible.

e) Increased Use of Coal - NRDC asserts that the discussion of the environmental impact of open pit mining is inadequate. This discussion can be found in section VIII. B. 4. of the statement.

f) Modification of FPC Natural Gas Pricing - This alternative has been expanded and includes a discussion of the relationship between increased prices, increased exploration and discovery rates, other areas of non-substitutability of gas for oil, and, FPC's rulemaking proposal.

g) Market Demand Prorationing Systems - NRDC asserts that Interior failed to consult with responsible Federal and State agencies on this issue. Drafts of this analysis were forwarded both to the State of Texas and to the Louisiana Department of Conservation for their review and comment. Extensive comments have been received from the Louisiana Department of Conservation and informal discussions have been held between Interior staff and Commissioner Menefee. The State of Texas has made no comment concerning this matter.

h) Reduction in Demand for Energy - NRDC asserts that this section has not received adequate treatment. It has been revised.

i) Combination of Alternatives - A section has been included in the alternative section of this statement which discusses the concept of combining two or more alternatives so as to provide the energy equivalent of the oil and gas potential of the proposed sale.

Attachment A*

TENTATIVE SCHEDULE — OCS LEASING

June 1971

SALES	1971	1972	1973	1974	1975
GULF OF ALASKA GENERAL		Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement	This sale, or one of comparable potential reserves, to be held prior to 1976.		
GULF OF MEXICO DRAINAGE	Draft E.Q. Statement; E.Q. Statement; Sale Notice; Sale				
E LOUISIANA GEN. & GULF OF MEXICO DR	Call; Nom. Due; Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement; Sale Notice; Hearing; SALE				
LOUISIANA GEN & GULF OF MEXICO DR	Call; Nom. Due; Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement; Sale Notice; SALE				
E TEXAS GEN & GULF OF MEXICO DR	Call; Nom. Due; Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement; Sale Notice; SALE				
ALA., MISS., & FLA GEN. & GULF OF MEXICO DR	Call; Nom. Due; Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement; Sale Notice; SALE				
LA & EAST TEXAS GEN & GULF OF MEXICO DR.	Call; Nom. Due; Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement; Sale Notice; SALE				
GULF OF MEXICO DRAINAGE	Call; Nom. Due; Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement; Sale Notice; SALE				
LA & TEXAS GEN. & GULF OF MEXICO DR.	Call; Nom. Due; Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement; Sale Notice; SALE				
ATLANTIC GENERAL	Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement	This sale, or one of comparable potential reserves, to be held prior to 1976			
GULF OF MEXICO DRAINAGE	Call; Draft E.Q. Statement; E.Q. Statement; Sale Notice; SALE				
GULF OF MEXICO GEN & DR.	Call; Nom. Due; Hearing Notice; Draft E.Q. Statement; Hearing; E.Q. Statement; Sale Notice; SALE				

*This schedule is subject to annual revision

Attachment B

PROPOSED GENERAL SALE

	Approx. Water Depth (feet)	Approx. Distance from Shore (Statute Miles)	Acreage	Primary Pro. Anticipated
Shoal				
98	15	11.5	5,000	oil and gas
110	24	12.6	5,000	oil and gas
160	42	23	5,000	oil and gas
202	102	36.8	5,000	oil and gas
320	330	64	5,000	oil and gas
326	342	61	5,000	oil
338	348	63	5,000	oil
343	360	66	5,000	oil
344	360	69	5,000	oil
345	360	68	5,000	oil
359	390	68	5,000	oil
Timbalier				
195	114	36	5,000	oil and gas
202	138	40	3,772.18	oil and gas
217	144	43	5,000	oil and gas
314	372	63	5,000	oil and gas
315	378	63	4,457.74	oil and gas
316	420	65	4,434.96	oil and gas
Isle				
58	120	19	5,000	oil and gas
65	132	21	5,000	oil
67	150	24	5,000	oil
69	156	24	5,000	oil and gas
76	144	24	5,000	oil and gas
84	150	26	5,000	oil and gas
94	198	36	4,539.89	gas
95	210	39	4,539.89	gas
Delta				
35 & 36(E 1/2)	66	9	1,804**	oil and gas
36(W 1/2)	66	10.5	1,446***	oil and gas
68 (North Half)	102	15	1,832.50	oil and gas
101	204	17	5,000	oil and gas
113	264	11	5,000	oil and gas
124	288	13	5,000	oil and gas
143	354	16	5,000	oil and gas
149	360	20	5,000	oil and gas
154	390	22	5,000	oil and gas

Area	Approx. Water Depth (Feet)	Approx. Distance from shore (Statute Miles)	Acreage	Primary Po. Anticipati
South Pass				
Block 46	210	5	2,500*	oil
47	264	4.5	4,700*	oil
48	300	4.5	4,999.96	oil
49	420	6	4,999.96	oil
51	480	7.5	4,999.96	oil
52	450	7	4,999.96	oil
53	360	7	4,999.96	oil
56 & 57	180	3.5	2,800*	oil
75	300	8	5,000	oil
76	270	6	5,000	oil
77	270	4.5	4,900*	oil
78	222	4.5	2,500*	oil
82	390	10	5,000	oil
83	432	12	5,000	oil
96	510	19	5,000	oil
Main Pass				
Block 60	78	10	4,000*	oil
61	108	8	3,500*	oil
138	132	14	4,994.55	oil
139	120	12	4,994.55	oil
140	150	10	4,994.55	oil
141	174	12.6	4,994.55	oil
146	192	10	4,560.81	oil
149	216	10	4,999.96	oil
150	240	10	4,999.96	oil
219	192	53	4,994.55	gas
220	210	53	4,994.55	gas
221	252	56	4,994.55	gas
222	264	56	4,994.55	gas
223	264	55	4,994.55	gas
245	204	48	4,994.55	gas
246	240	49	4,994.55	gas
247	270	52	4,994.55	gas
261	276	52	4,994.55	gas
262	270	49	4,994.55	gas
263	246	47	4,994.55	gas
280	300	51	4,994.55	oil and gas
281	330	51	4,994.55	oil and gas
282	330	53	4,994.55	oil and gas
302	228	15.5	4,999.96	oil and gas
303	228	18	4,999.96	oil
304	240	21	4,999.96	oil
309	270	21	4,999.96	oil
310	252	18	4,999.96	oil
311	246	15	4,999.96	oil

* - Approximate Acreage Seaward of Decree Line
** - Approximate Acreage in Zone 2
*** - Approximate Acreage in Zone 3

Texas Instruments Inc., "Oceanographic and Remote-Sensing Survey in the Vicinity of the Shell Spill, Gulf of Mexico, January, 1971," prepared for the Environmental Protection Agency.

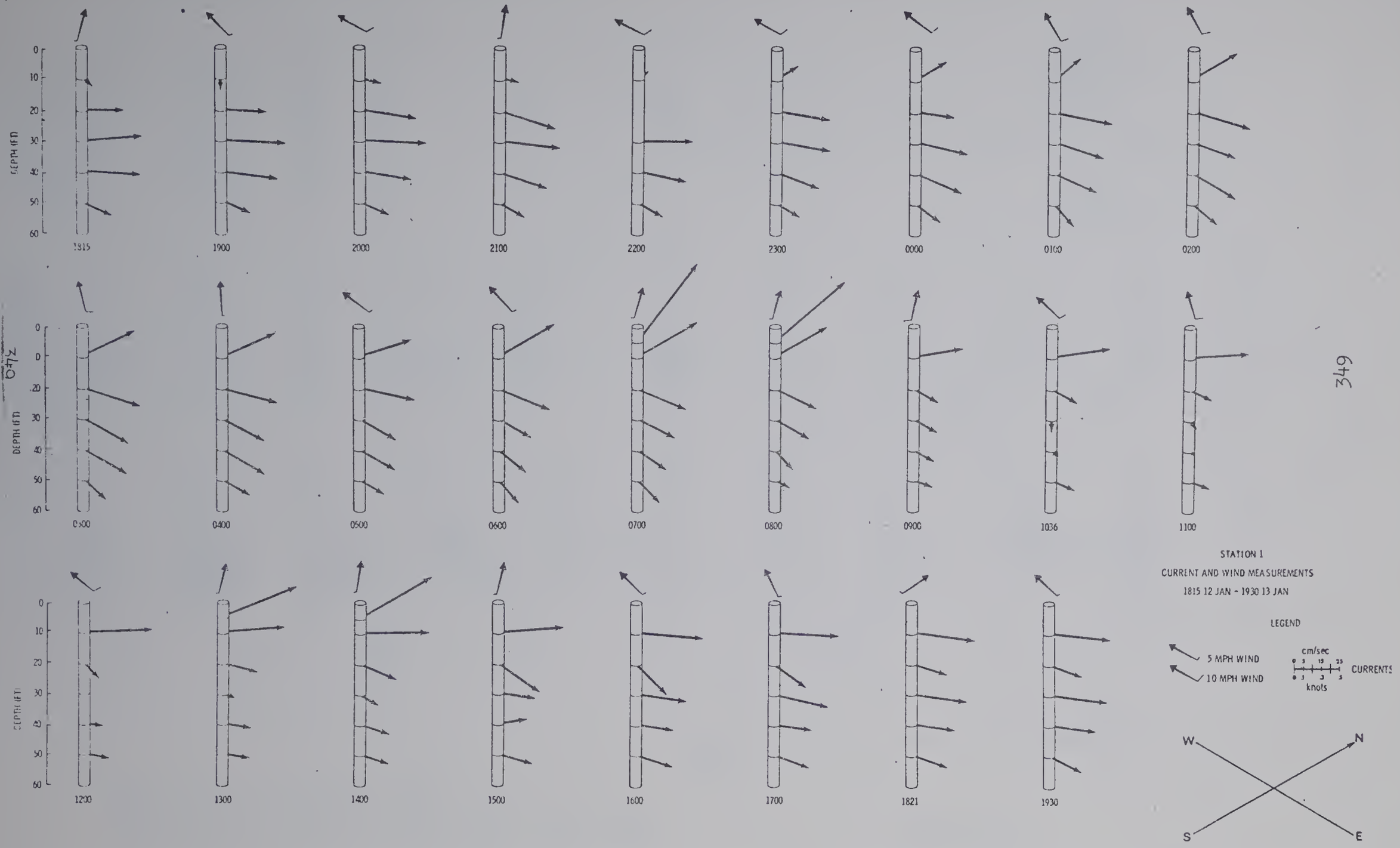


Figure 1 Hourly Current and Wind Measurements, Station 1

Texas Instruments Inc., "Oceanographic and Remote-Sensing Survey in the Vicinity of the Shell Spill, Gulf of Mexico, January, 1971," prepared for the Environmental Protection Agency.

Attachment C
Figure 2

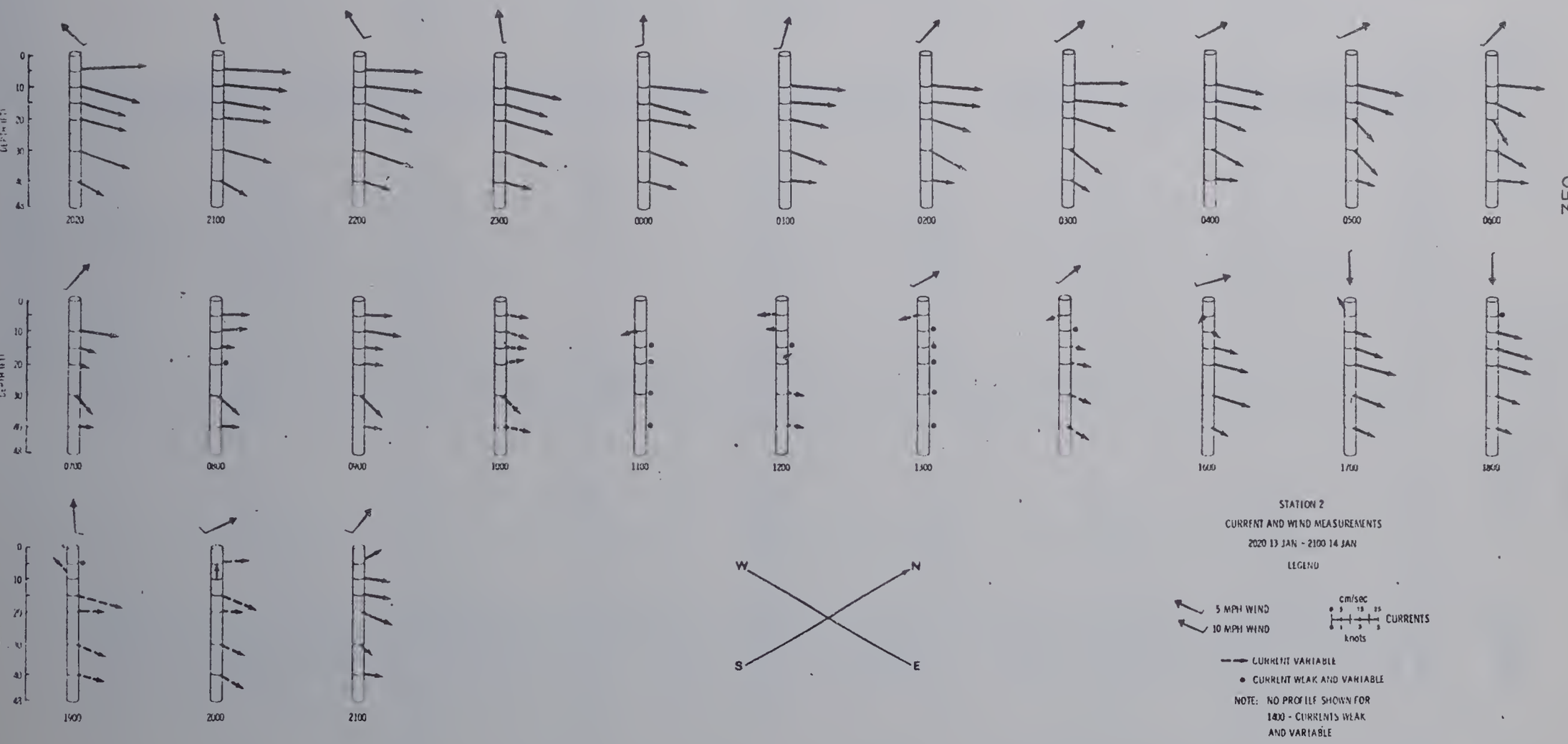


Figure 2 Hourly Current and Wind Measurements, Station 2

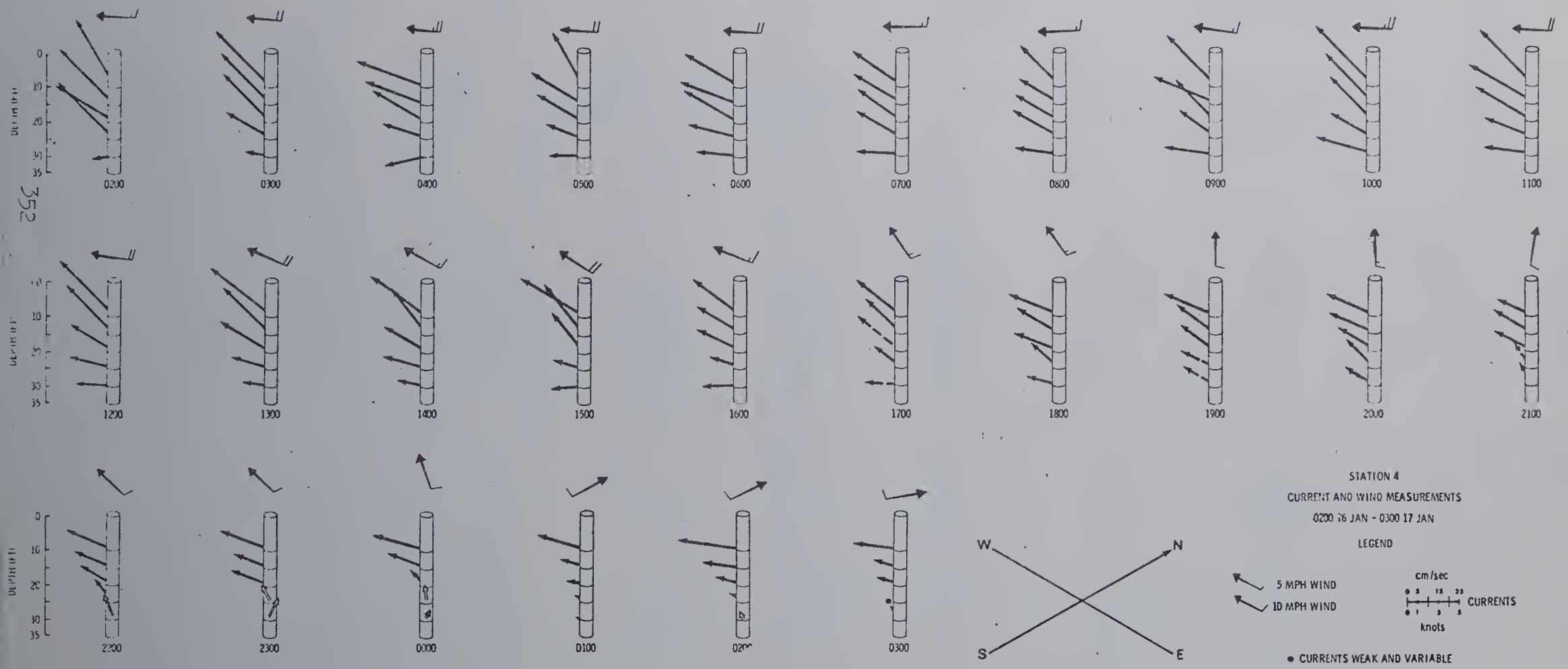
mote-Sensing Survey in the Vicinity of the Shell Spill, Gulf of Mexico, January, 1971," prepared for the Environmental Protection Agency



Figure 3 Hourly Current and Wind Measurements, Station 3

Texas Instruments Inc., "Oceanographic and Remote-Sensing Survey in the Vicinity of the Shell Spill, Gulf of Mexico, January, 1971," prepared for the Environmental Protection Agency.

Attachment C
Figure 4



Attachment C

Figure 5 Current and Wind Data and Oil-Slick Orientation, 13 January 1971

Texas Instruments Inc., "Oceanographic and Remote-Sensing Survey in the Vicinity of the Shell Spill, Gulf of Mexico, January, 1971," prepared for the Environmental Protection Agency.

Attachment D

Summary

Recreation and Fish and Wildlife Areas Along the Gulf of Mexico Coast-Louisiana, Alabama, and Mississippi

Area	State	Type of Area	Ownership	Acreage
(1) Gulf Islands National Seashore	Florida, Mississippi	Recreation	Federal	125,448*
(2) Chandeleur Island	Louisiana	Recreation	State	4,420
(3) Grand Isle	Louisiana	Recreation	State and private	1,000 (126 - State)
(4) Fontembleau State Park	Louisiana	Recreation	State	2,755
(5) Fort Pike State Park	Louisiana	Recreation	State	125
(6) Fort McComb State Park	Louisiana	Recreation	State	20
(7) Magnolia State Park	Mississippi	Recreation	State	200
(8) Dauphine Island	Alabama	Recreation	State and private	(Undetermined)
(9) Sabine	Louisiana	Wildlife Refuge	Federal	142,845
(10) Lacassine	Louisiana	Wildlife Refuge	Federal	31,776

* 17,948 acres of up-lands; 107,500 acres of submerged lands

Area	State	Type of Area	Ownership	Acreage
(11) Delta	Louisiana	Wildlife Refuge	Federal	48,799
(12) Shell Keys	Louisiana	Wildlife Refuge	Federal	8
(13) Breton Island	Louisiana	Wildlife Refuge	Federal	9,047
(14) Petit Bois	Alabama and Mississippi	Wildlife Refuge	State	375
(15) Rockefeller	Louisiana	Wildlife Refuge and Game Preserve	State	86,000
(16) Louisiana State	Louisiana	Wildlife Refuge and Game Preserve	State	15,000
(17) Marsh Island	Louisiana	Wildlife Refuge and Game Preserve	State	83,000
(18) St. Tammany	Louisiana	Wildlife Refuge	State	1,310
(19) Paul J. Rainey	Louisiana	Wildlife Refuge and Game Preserve	Private	29,000
(20) Bonne Carre	Louisiana	Game Management Area	State	3,789
(21) Biloxi	Louisiana	Wildlife Management Area	State	39,728
(22) Pass-A-Loutre	Louisiana	Game and Fish Preserve State Hunting Ground	State	66,000

Area	State	Type of Area	Ownership	Acreage
(23) Wisner	Louisiana	Wildlife Management Area	State	30,000
(24) Bohemia	Louisiana	Game Management Area	State	30,000
(25) Pointe Au Chien	Louisiana	Wildlife Management Area	State	27,504
(26) Salvador	Louisiana	Wildlife Management Area	State	28,469



Refuges

(1) Sabine National Wildlife
(2) Rockefellar Wildlife Refuge & Game Preserve
(3) Paul J. Rainey Wildlife Refuge and Louisiana State Wildlife Refuge & Game Preserve
(4) Marsh Island Wildlife Refuge & Game Preserve
(5) Shell Key National Wildlife Refuge
(6) Wisner Wildlife Management Area
(7) Delta National Wildlife Refuge
(8) Pass a Loutre Game & Fish Preserve State Public Hunting Ground
(9) Breton Island National Wildlife Refuge
(10) Biloxi Wildlife Management Area

Attachment E.

Daily Distribution of Traffic In
Gulf of Mexico
Present and Forecast 1/

	Tankers over 100 GRT (1969)	Bulk Carriers 100 GRT (1969)	Fishing Vessels 100 GRT (1969)	Other Vessels 100 GRT (1969)	Total Synthesized Data (1969) 2/	Total 1972 Forecast	Total 1980 Forecast (Includes TAPS)
Straits of Florida	9	--	3	7	19	27	21
Eastern Gulf of Mexico	12	--	2	3	17	19	17
Western Gulf of Mexico	5	--	1	3	9	6	10
Mobile Area	15	3	2	42	62	77	73
Entrance to Miss. River	3	--	1	14	18	16	19

1/ This table was prepared from information contained in A Study of Maritime Mobile Satellites, Vol. I, "Merchant Vessel Population/Distribution Present and Forecast", Automated Marine International, Newport Beach, California.

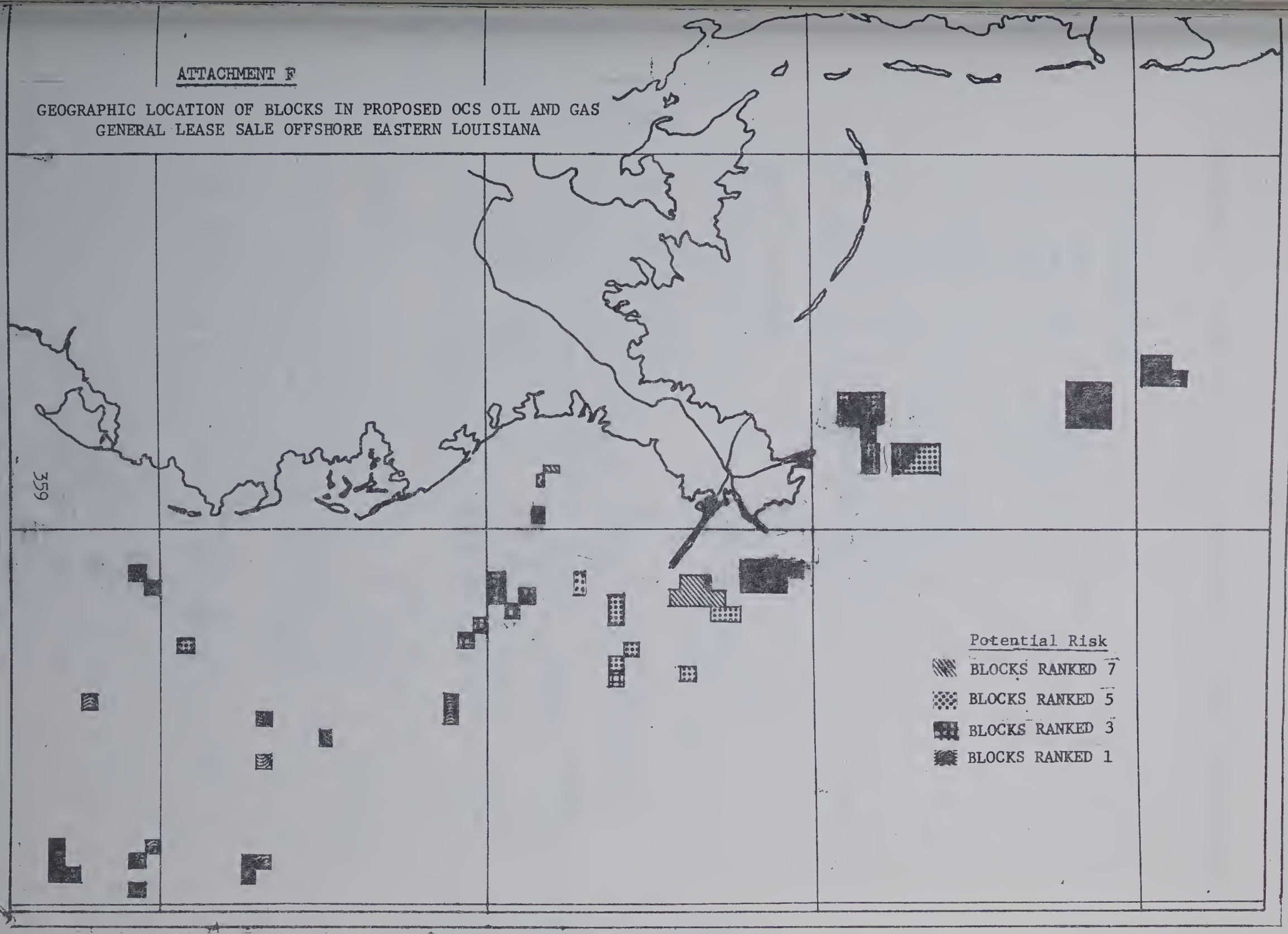
2/ Includes all vessels over 100 GRT.

Provided by:
U.S. Coast Guard
400 7th Street, S.W.
Washington, D. C. 20590

Gen. Coast Guard
400 7th Street, S.W.
Washington, D.C.

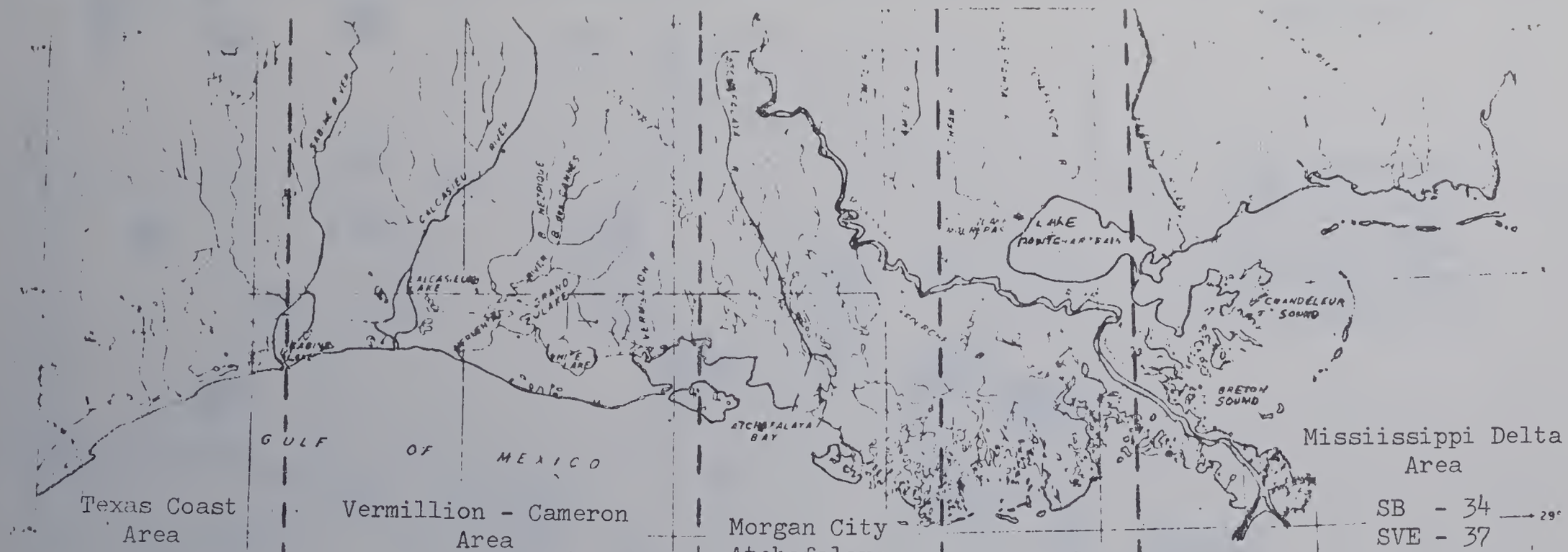
ATTACHMENT F

GEOGRAPHIC LOCATION OF BLOCKS IN PROPOSED OCS OIL AND GAS
GENERAL LEASE SALE OFFSHORE EASTERN LOUISIANA



EQUIPMENT AVAILABLE FOR EMERGENCY OIL SPILL CONTROL AND CLEANUP IN THE GULF OF MEXICO

ATTACHMENT G



Texas Coast Area

SB - 18
SVE - 10
SP - 22
H - 9
FWA - 48

Vermillion - Cameron Area

SB - 28
SVE - 4
SP - 13
H - 8 MC
FWA - 0

Morgan City Atchafalaya Area

SB - 72
SVE - 14
SP - 31
H - 17 MC
FWA - 3 MC
2 LF
5

Grand Isle La Fourche Terre Bonne Area

SB - 25
SVE - 39
SP - 30
H - 6 GI
6 LV
1 HM
1 DL
14
FWA - 1 LV
4 HM
5

Missiissippi Delta Area

SB - 34
SVE - 37
SP - 55
H - 8 VN
5 EM
2 TC
1 NO
16
FWA - 6 NO
4 TC
3 VN
13

Total Area

Spray Equipment - 20

Cities Where Available

MC - Morgan City
CM - Cameron
LF - Lafayette
GI - Grand Isle
LV - Leeville
HM - Houma
DL - Dulac
VN - Venice
EM - Empire
NO - New Orleans

Types of Equipment

SB - Service Boats
SVE - Skimmer & Vacuum Equipment
H - Helicopters
FWA - Fixed Wing Aircraft
SP - Spill Booms

SCALE

Attachment of Comments Received Concerning the Draft Environmental Statement

1. Federal Agencies

a. Bureau of Sport Fisheries and Wildlife
b. Atomic Energy Commission
c. Bureau of Outdoor Recreation
d. National Park Service
e. Department of Commerce
f. Bureau of Mines
g. Federal Power Commission
h. Environmental Protection Agency
i. Department of Transportation
j. Office of Emergency Preparedness
k. Council of Economic Advisers
l. Geological Survey

2. State Agencies

a. State of Louisiana, Wildlife and Fisheries Commission
b. State of Louisiana, Department of Conservation
c. State of Texas
d. State of Mississippi, Office of the Governor
e. State of Mississippi, Board of Water Commissioners
f. Gulf Regional Planning Commission
g. State of Mississippi, Office of the Attorney General
h. State of Mississippi, Department of Archieves and History
i. State of Mississippi, State Board of Health
j. State of Mississippi, Mississippi Geological, Economic and Topographical Survey

3. Others

a. Associated Gas Distributors
b. Texas Gas Transmission Corporation
c. Tilford A. Jones, Attorney for United Distribution Companies
d. Atlantic Richfield Company
e. Humble Oil and Refining Company
f. Louisiana Land and Exploration Company
g. Skelly Oil Company
h. Cities Service Oil Company
i. National Public Lands Task Force
j. Shell Oil Company
k. Getty Oil Company
l. National Resources Defense Council, Inc.

ADDRESS ONLY THE DIRECTOR,
BUREAU OF SPORT FISHERIES
AND WILDLIFE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
WASHINGTON, D.C. 20240

MAY 11 1972

Memorandum

To: Director, Bureau of Land Management
Through: Assistant Secretary for Fish and Wildlife and Parks

From: ACTING Chief, Office of Environmental Quality

Subject: Review of Draft Environmental Statement for the Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Eastern Louisiana (DES-72/47)

Your memorandum of March 30, 1972, requested that we review the subject statement and provide our comments and suggestions by May 15, 1972.

The Bureau of Sport Fisheries and Wildlife assisted your staff in the preparation of a working draft of this statement. The following comments and questions are intended to correct technical errors, provide additional data, and offer constructive criticism.

Page 8, line 1. Delete "in the area" and insert "adjacent to the refuges."

Page 8, Sport Fish, Nursery Zone. Delete "striped bass" as it is not a major species in the Gulf of Mexico area. Place comma after "spot." Add "tarpon" and "ladyfish."

Page 8, Commercial Fish, Nursery Zone. Change to read, "same as above plus menhaden but not tarpon."

Page 9, Florida, line 4. After "All" insert "water oriented."

Page 9, Mississippi, line 2. After "Mississippi" insert "mainland."

Page 9, Louisiana, line 3. After "study" add "boating." Line 4. After "nature of" add "most."

Page 10, Texas. 359 and 301 miles do not equal 1,081 miles.

Page 11, Resource Use. In addition to mineral industry, commercial fishing, etc., other major uses are (a) research and education, (b) fish and wildlife conservation and management, (c) fish and wildlife habitat, (d) waste disposal, (e) treasure hunting, (f) archeology, and probably others.

Page 14, paragraph 2. This probably is correct unless a point of no return (pollution-wise) is being approached in coastal Louisiana.

Page 15, Table.

(a) Debris probably would exert a positive influence on sport fishing as it would also act as a submerged reef and attract fish similar to that of a platform.

(b) Oil spills adversely affect commercial and sport fishing by physically denying fishing areas, fouling gear and boats, and reducing market demand for the product and services (charter boats). They should be rated a (-).

(c) Pipelines are not officially regulated on private recreation beaches and other property. The same is true for storage facilities.

(d) Support service includes boat transportation of men and equipment which requires navigation channels in estuaries and marshes. This is a major factor for coastal navigation channel construction in Louisiana.

Overall, some means should be available (such as an asterisk) to indicate those relationships which have both positive and negative impacts.

Page 19, paragraph 2. Does this mean 6 years plus 20, or is it 20 years after full production has been achieved?

Page 25, last paragraph. Does each of six hurricanes cause the damage cited, or is this the season total for all storms?

Page 31, paragraph 1. Inaccessibility is due primarily to a lack of roads. Most of the area is accessible by boat. If only 7 percent of the demand is met, what do the other people do for facilities?

Page 31, last paragraph. Do the 128 islands in Mississippi include islands in the Mississippi River far removed from the coast?

Page 34. It is the Chandeleur Islands, not Island.

Page 35, paragraph 2. Delete. This is covered in the other sections. The islands do not support large concentrations of geese now.

Page 38, paragraph 2, last line. Move footnote reference 2/ to the end of the sentence.

Page 40, paragraph 3. Delete. The 58.6 million pounds cited is "heads off" weight and, of course, is much less and in conflict with the total weight shown in Table 1. The Louisiana shrimp catch for 1971 was 92.4 million pounds. Also delete footnote.

Page 41, paragraph 2, sentence 2. Change to read, "Menhaden accounted for more than 1.5 billion pounds of the total Louisiana and Mississippi catch in 1971 of 1.8 billion pounds."

Page 43, paragraph 1. Offshore fisheries have been developed, i.e., shrimp.

Page 44, paragraph 1, line 4. Should it be "oil and gas" after producing? How many platforms are there in the State waters?

Page 45, last line. Many would disagree that adequate safeguards are being provided. We suggest the following language: "...providing the most comprehensive and advanced safeguards ever employed."

Page 46, paragraph 1. Issuance of the leases would also have an impact through support functions and servicing activities. This would require the stockpiling and transport of materials and men by boat which would require navigation development if not already present. In addition, more storage facilities (on shore) might be required as well as more refining capacity. Also, additional geophysical surveys would result. There also would be a socio-economic impact locally or regionally which, for the most part, probably would be beneficial, although some conflict would result with other uses or endeavors which would have to compete with "oil" for employment, wages, consumer goods, etc.

Page 47, last paragraph. Platforms also can pose a hazard to commercial fishing boats as well as recreation craft and marked fairways for commercial shipping would not help.

Page 50, paragraph 2. Rig access canals frequently are used to emplace collector pipelines. Last sentence. In front of "permitting" insert "wave action on exposed banks."

Page 53, last line. Most of the oil spilled at Santa Barbara did not come from a platform but from a rupture in the bottom near the platform.

Page 54, paragraph 3, last line. Actually, the oil was not all retransported to deeper water but was in the process of being retransported to deeper water.

Page 56, paragraph 1. Dr. Mackin was requested at the Public Hearing to provide the Department with the data from this study as well as all reports. So far as we know, this was not done. This should be so stated in the text or in the footnotes.

Page 56. This would be a good place to include results of a study of the Shell Company spill. The Environmental Protection Agency has the report. We understand that considerable change occurred to the biota of a very large area.

Page 56, last paragraph, line 4. This is not the case for sea birds of the Atlantic Ocean where severe mortality has been caused by oil pollution.

Page 58, paragraph 3, last line. Add the following sentence: "It should be noted, however, that evaporation was facilitated because discharge from the wild wells sprayed high into the air under great pressure, where winds carried it for considerable distance before it fell to the water surface."

Page 60, paragraph 1. The total number of spills discussed is 1,261, not 1,239 as stated on page 59.

Page 61, top of page. In practice, is it possible to meet the 50 ppm requirement, and how is this determined?

Page 61, paragraph 2, line 9. Add after "facilities," "and if pipeline capacity is available."

Page 61, paragraph 3, line 2. How was the volume of oil obtained for the unidentified sources as the total volume is not given on page 60?

Page 62, paragraph 1. Change 174,000 to 174,200 to be consistent with paragraph 2 or round all numbers to the nearest thousand.

Page 63, last paragraph. Expand to acknowledge that the figures cited do not include oil spilled on or in State waters and marshes.

Page 64, paragraph 1, line 5. After "currents," insert "presence of birds, commercial fishing."

Page 66, paragraph 1. On page 62, it is stated that there has been nine spills in 10 years. Which is correct? Last line. Check the study report of the Shell spill as it may be different than the others

Page 70, Resources Affected. Change Delta Migratory to Delta National Wildlife Refuge. We understand that an additional platform was destro[illegible] causing an oil leak.

Page 72, paragraph 3. We question that an oil company would have the expertise to determine how structures should be placed to reduce impact on commercial fishing. The same probably is true for the Regional Supervisor of the Geological Survey. What is needed is a study to determine how this should be done. Also, approval or disapproval of structure installation relative to commercial fishing should be in consultation with official fishery agencies and commercial fishery industry representatives.

Page 74, paragraph 3. Pollution also could result from sabotage, war, and insurrection.

Page 75, paragraph 1. How does research need to be strengthened?

Page 77, 8. Contingency Plans and Equipment. A discussion of the Regional Oil and Hazardous Materials Pollution Contingency Plan is needed here or refer to the section or page on which it is described.

Page 78, Departure, (a)-(e). Do all of these conditions have to be present or will any one of them suffice to grant a waiver? Would not the removal of a subsurface safety device or not installing it when a well was not on artificial lift increase the possibility of pollution? Would not a waiver for a subsurface safety device be to improve production and not to conserve natural resources and protect aquatic life or the environment?

Page 80, paragraphs 2 and 3, last sentences. This indicates or implies that the oil companies would not comply with the OCS orders and regulations if they were not under virtually constant observation.

Page 81, paragraph 1. This indicates that more than 700 platforms were not inspected during 1971. Are there 631 drilling rigs operating in the Gulf or does this refer to drilling operations? The last sentence shows 80 rigs operating.

Page 81, last paragraph. How many pollution incidents and other infractions were observed during the surveillance flights, and how were they disposed of?

Page 82, paragraph 1. How many shut-ins were necessary last year, and how many warnings were issued?

Page 83, 2. The Regional or National Oil and Hazardous Materials Pollution Contingency Plan is not cited correctly.

Page 87, paragraph 1. The U.S. Army Corps of Engineers issues permits for structures in regard to national defense as well as for navigation.

Page 89, paragraph 2, line 9. Delete "in this way" and substitute "from oil pollution."

Page 91, line 8. Insert "other" between "in" and "navigable."

Page 94, last sentence. This should be placed in Section V.A. Oil Pollution Effects on Marine Environment.

Page 96, last paragraph. How far over a horizontal distance is directional drilling practical?

Page 97, VI. Another local short-term use is the concentration and harvest of fishery resources at structures.

Page 99, VII, paragraph 1. Marshlands also can be lost through construction of navigation channels needed to service offshore development. For examples, access channels between the Gulf Intracoastal Waterway and the Gulf of Mexico proper.

Page 100. This describes very well the action proposed and is not an alternative.

Page 101, paragraph 1. How could withdrawing the sale or reducing the number of tracts to be offered reduce projected future energy demand? Demand would not diminish, but the ability to supply the demand would unless other sources were used.

Page 101, paragraph 2. The 5-15 years cited are different from the 6-year development and 20-year production periods used elsewhere in the statement.

It is not the number of alternatives available but their relevance and significance that is important.

Page 101, paragraph 3. Several of the energy sources listed cannot be developed in time to replace the short-run energy needs which this sale would supply. This would certainly include oil shale production and possibly increased hydroelectric power and nuclear power as well.

Page 102, paragraphs 1 and 2. Oil shale is in this category, and additional nuclear energy and hydroelectric power probably is also because of delays in development.

Page 129, paragraph 4, line 5. Change "contact" to "contrast."

Page 130, paragraph 2, last sentence. Do all of the pipelines referred to have such safeguard equipment?

Page 140, paragraph 1, last line. After "sediments," add "as well as salt water intrusion."

Page 140, paragraph 2, last line. After "operators," add "and regulatory agencies."

Page 141, paragraph 3, line 2. After "reservoirs," add "and estuaries."

Page 141, paragraph 4, line 1. After "reservoirs," add "and estuaries." Line 2. Delete "reservoirs" and substitute "basin."

Page 159, last sentence. After "However," insert "sometimes."

Page 175. How many employees would be needed to develop and produce the oil and gas on OCS for this sale, and how many of these would be expected to be injured and killed?

Page 183, paragraphs 1 and 2. Compare with the accidents and deaths expected for OCS oil and gas activities.

Page 202, last line. Add "fish and wildlife resources, recreation, and agriculture."

Page 249. Elsewhere in the statement it is stated that more than four major spills have occurred.

Attachment D. Delete Horn Island as it now is part of the Gulf Islands National Seashore. Correct the map (Figure 1) as follows:

(1) Sabine National Wildlife Refuge
(5) Shell Key National Wildlife Refuge
(7) Delta National Wildlife Refuge
(9) Breton Island National Wildlife Refuge

In addition, Paul J. Rainey Refuge is part of No. (3) Louisiana State Refuge.

In summary, we find that for the most part the statement adequately fulfills the requirements of the National Environmental Policy Act. The proposed action and the possible consequences of that action are well described. That the statement can be improved is true of virtually all statements that we have seen and probably all that have been prepared so far. We hope that our review comments will assist you in the preparation of your final statement.

If we can be of additional help or any of our comments need clarification, do not hesitate to call on us. We appreciate the opportunity to review your draft statement.

Walter M. Bartlett

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

May 15, 1972

Mr. Donald Truesdell
Department of the Interior
Bureau of Land Management
Branch of Marine Minerals (313)
Washington, D. C. 20240

Dear Mr. Truesdell:

The draft environmental statement concerning a proposed outer continental shelf oil and gas general lease sale (your ref. 3390.1-313) has been reviewed. As a general observation we note that the statement does not include an analysis of the benefits and environmental risks of the proposed action and each reasonably available alternative so that informed judgement can be made about the wisdom of undertaking the proposed action rather than one of the alternatives. Such an analysis would seem to be required by several recent judicial decisions interpreting the National Environmental Policy Act.

With regard to the nuclear power alternative section, this was reviewed and commented on in an earlier draft by Commission staff. We note that it has been revised in accordance with these comments. However, a draft of a subsequent OCS lease sale statement has also been reviewed and additional comments offered to revise and update it. These comments also apply to this draft and when incorporated in accordance with discussions with your staff should result in an adequate treatment of this alternative.

Thank you for the opportunity to review this statement.

Sincerely,

Julius H. Rubin
Assistant General Manager
for Environment and Safety

[redacted]

United States Department of the Interior

BUREAU OF OUTDOOR RECREATION
WASHINGTON, D.C. 20240

REPLY REFER TO:

313

MAY 5 1972

Memorandum

To: Director, Bureau of Land Management
Attention: Branch of Marine Minerals

From: Deputy Director, Bureau of Outdoor Recreation

Subject: Review of Draft Environmental Statement on Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale, Offshore Eastern Louisiana (DES 72-47)

We have reviewed the subject statement and find it adequately assesses potential adverse impacts to the environment from the proposed general lease sale. We offer the following comments for your consideration.

We believe the statement has identified the relative significance of the Gulf of Mexico area including its recreation resources and attendant environment. We would assume, however, that as additional sales are proposed, that more finite data will become available which should be incorporated into future statements. We are especially concerned about the long-term cumulative effects of oil pollution on the natural resource base including recreation resources potentials along the coastal zone bordering the Gulf Coast States.

The Bureau of Outdoor Recreation is cognizant that the proposed lease for oil and gas development on the Outer Continental Shelf off Louisiana represents a potential threat to the Gulf Coast recreation environment. In this connection, we are primarily concerned with oil, gas, and other forms of pollutants insofar as they degrade or may degrade the environment in which recreation takes place. We are likewise concerned with the potential of the proposed development to take away recreation opportunities which are as yet undeveloped.

Alternatives included in the draft statement present no real short-term strategy for meeting domestic energy demands should the proposed sale be withdrawn. Alternatives are presented as an "either/or" situation excluding the possibility of multiple-use solutions which may consider one or more of the alternatives presented. Alternative choices as discussed assume total reliance on single-energy sources needed in the absence of the proposed OCS leases. In reality, a diversification of energy sources would be involved depending on the availability and market areas.

We appreciate the opportunity to provide these comments.

Roman H. Koenings

Roman H. Koenings

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WASHINGTON, D.C.
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United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

L7427-CC

ADVANCE COPY

Memorandum

To: Director, Bureau of Land Management
Attention: Mr. Donald Truesdell, Branch of Marine Minerals
Through: Assistant Secretary for Fish and Wildlife and Parks

From: Assistant Director, Cooperative Activities

Subject: Draft environmental statement concerning a proposed oil and gas lease sale offshore Eastern Louisiana (DES 72-47)

In his memorandum of March 30, Acting Director, George L. Turcott asked us to review the subject draft environmental statement and send our comments to you.

The Gulf Islands National Seashore Project is the only existing or proposed unit of the National Park System that possibly could be affected by the proposed oil and gas lease sale. The western end of the 150-mile long seashore project lies some 50 miles northeast of the most easterly of the proposed oil and gas leases. The lease sale area is about 230 miles long and 50 miles wide. Therefore, any oil spills occurring in the lease sale area would be from 50 to 280 miles from the nearest point of the seashore project. The Fort Morgan National Historic Landmark in Alabama is some 60 miles from the nearest lease sale area.

The draft statement should show evidence that the National Register of Historic Places was consulted to identify historic places which might be affected by the proposed general lease sale. Also, the Louisiana State Historical Preservation Officer should be consulted concerning places which may be under consideration for addition to the register. He is the Chairman, Louisiana Historical Preservation and Cultural Commission, Post Office Box 44422, Capitol Station, Baton Rouge, Louisiana 70804.

We recommend that surveys be made of the Outer Continental Shelf to identify and evaluate natural and cultural values. The results of such surveys would be invaluable in determining appropriate uses for specific areas of the shelf and in assessing the environmental impacts of proposed actions on shelf resources.

The draft statement makes no reference to the effect of the proposed action on archeological values. Shipwrecks of historical interest have occurred in the lease sale area and Indian sites exist on many offshore Gulf islands. Therefore, shorelines, offshore islands, and areas of clear shallow water which would be affected by oil operations should be surveyed by professional archeologists to inventory archeological resources. Provision to avoid or salvage important historical or archeological resources should be delineated in the final statement.

We also offer the following detailed comments:

1. Page 10: "Suwannee" is misspelled in the list of areas which may be established.

2. Page 32, second paragraph, third sentence: Insert a comma after "Petit Bois" and delete "...Island in Alabama and Mississippi, and..."

3. Page 32, third paragraph, second sentence: Substitute "extensive" for "almost unlimited".

4. Page 33, first paragraph, third sentence: Insert "after establishment" following "...within five years."

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THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

May 15, 1972

Mr. Donald Truesdell
Bureau of Land Management
Branch of Marine Minerals (313)
U.S. Department of the Interior
Washington, D. C. 20240

Dear Mr. Truesdell:

The draft environmental statement for the "Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale, Offshore Eastern Louisiana," reference 3390.1 (313), was received by the Department of Commerce for review and comment.

The Department of Commerce has reviewed the draft environmental statement and has the following comments to offer for your consideration.

The statement dated March 31, 1972 appears to be essentially an expanded version of the latest final environmental statement provided earlier. Consequently, our observations regarding that statement are pertinent and can be related to the appropriate portion of the draft of March 31, 1972. These are appended here as a part of this submittal as well as some additional comments on specific sections of this latest statement.

On page 25, in the second paragraph, the fourth sentence should read "under certain conditions these disturbances increase in size, speed and intensity until they become hurricanes <u>when winds reach or exceed 74 miles an hour</u>.

The last sentence on the page should read: "Over the last 10 years, tropical cyclones have caused an average of 50 deaths per year between Texas and Maine, and property damage exceeding $400 million dollars."

The entire discussion of weather in the Gulf of Mexico has been confined to references to tropical cyclones. It is suggested that the following paragraphs be added to the text:

In addition to the tropical cyclones, extratropical cyclones which may vary greatly in intensity occur in this area primarily during the winter months. These storms have attained wind speeds as great as 30 to 50 knots. They originate in middle and high latitudes forming on the fronts that separate different air masses. The Gulf of Mexico is an area of cyclone developmen during the cooler months due to the contrast in temperatures of the warm air over Gulf waters and the cold continental air over the United States. From August 1959 through April 1970, 90 such extratropical cyclones have passed within 120 miles of the Mississippi Delta Region and could possibly have affected the area.

A phenomena known as a "norther" is quite common in the area in question during the winter months. A norther occurs when cold, polar air moves southward from the cold interior of the North American continent out over the warm waters of the Gulf. This unstable cold air mass, when heated from below, develops strong gusty northerly winds with considerable cloudiness and showers. During a typical winter as many as 30 such cold outbreaks reach the Gulf coast. The majority of these cold outbreaks, spilling out over the Gulf, produce winds in the 15-20 knot range but approximately one third of these cold outbreaks have winds over 34 knots with approximately half of these being vigorous enough to reach 48 knots.

Under section III, the Environmental Impact of the Proposed Sale Part A, Possible Impacts of Proposed Leasing Action, Number 4, Oil Pollution, (on page 58), this portion of the statement describes the evaporation of 35 percent of the total oil discharge in the Chevron Company fire. Some discussion of the fate of the remaining 65 percent of the oil should appear here.

In Part B, Analysis of Environmental Risks to Resource Use, the analysis (page 66) states that "As far as has yet been determin the few previous large spills occurring in the Gulf of Mexico resulted in minimal damage." In our opinion, minimal effects encountered thus far may be attributable to the favorable prevailing offshore winds and surface currents, which tend to prev oil slicks from reaching vulnerable estuaries and wetlands.1/

1/ U.S. Department of Interior, Assistant Secretary for Fish, Wildlife and Parks, "Interim Evaluation of Environmental Impact from the Chevron Company Fire and Oil Spill off Coastal Louisiana, February and March 1970," unpublished report 9/19/70

In Part C, Areas of Special Consideration, the placement and grouping of structures required to provide minimal effect on commercial fishing operations should be coordinated with the National Marine Fisheries Service (NMFS) and local fishermen's organizations.

Under Section V, Unavoidable Adverse Effects, Part B, Pipeline Construction Effects on Marshes and Bottom Resources (pages 90-91) a partial list of agencies having responsibilities or jurisdiction over all or part of oil and gas pipeline installation and operation in coastal areas is provided. By virtue of Reorganization Plan No. 4, the NMFS is the principle Federal agency responsible for marine, estuarine, and anadromous fishery resources and, therefore, should be included in this listing.

Sincerely,

Sidney R. Galler

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Attachment

National Marine Fisheries Service comments on Environmental Impact Statement entitled "Proposed 1971 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Eastern Louisiana"

These comments will be divided into three sections corresponding to the three documents submitted for review.

"Final" Environmental Impact Statement

This statement is well written, obviously the work of a person or persons well-versed in the ecology of the Gulf Coastal region. There is considerable documentation to support the statements and conclusions of the writers. However, we believe that some pertinent references were not alluded to, that some areas of impact were discussed too briefly or not at all, that some very recent findings are not mentioned, and that some further conclusions can be drawn.

On Page 28, paragraph 3, we re-iterate a comment made regarding the July 26, 1971, draft statement in which we note that recent commercial fishing activities indicate a trend toward deeper water harvest and, therefore, the fact that the majority of tracts are located in depths greater than 180 feet may not in itself protect the fishing activity.

Concerning the references discussed in the section "Oil Pollution," pages 29 to 35, we believe that several other citations that are relevant could be used. First, the study by Mackin and Sparks showed no effects on oysters from the released crude oil. 1/ Second, a study just completed by contract for Environmental Protection Agency showed that three weeks after a small oil spill in Puget Sound there was evidence of damage to bottom dwelling organisms, residue in the sediment, and changes in species diversity. 2/ Third, we find that references to the Straughan report only lead to confusion, as the study concerned a very atypical situation. The only usefulness to that report is to illustrate a need for baseline studies prior to an oil contamination situation. None of these studies, or others cited in the EIS, can be properly evaluated until we know the chemical constituents of the various oils or petroleum products under study. In June 1971, representatives of several Federal agencies met with API representatives to discuss results of API funded research. At that meeting E. W. Mertens of Chevron Research Company pointed out that a fuel identified as No. 2 does not have fixed constituents. This applies to almost all petroleum products. Therefore, until each petroleum product used in tests has its constituents identified, we cannot make valid comparisons of effect on biota.

1/ Mackin, J. G., and A. K. Sparks, "A Study of the Effect on Oysters of Crude Oil Loss from a Wild Will", Publ.Inst. of Mar.Science,Texas, Vol. 7, July 1962. PP 230-261.

2/ "Biological Assessment of a Diesel Spill in the Vicinity of Anacortes, Washington, May 1971. Final Report. Texas Instruments Company, Inc., J. A. Watson, J. [illegible] C. Ehrgam,Jr. Coastal [illegible] ment no

On Page 36, the section on Waste Water gives the oil composition of waste water but does not indicate what the remainder of the contents might be. Since waste waters from other industrial activities are known to contain many toxic or dangerous substances, we believe that results of analyses of samples of waste water should be referenced.
Pages 38-43, Analysis of Environmental Risks to Resource Use - This is an excellent concept and potentially useful. Its usefulness could be enlarged by the addition of wind roses and water current roses or some similar graphic display of these two important physical factors.

Pages 45-50. This section does not mention whether there are any known or anticipated effect on species which inhabit the offshore waters, especially those like shrimp which spawn in these areas. Considerable attention is given to estuarine inhabitants. It appears to us that potential effects on these deeper water species, or those which move into deeper water at certain seasons or life stages, warrant a discussion. We mention this because: (1) allusion to shrimp spawning in offshore waters (page 23) therefore, the eggs and early life stages are apt to be offshore for a time; (2) Blume, et al (page 33) and others, have indicated that much mixing of hydrocarbons and water occurs and the entire water column and bottom sediments are contaminated, and (3) on page 39 the discussion of the tendency of wind and currents to keep oil (for instance from the Chevron fire) away from the shore line, which appeared favorable. However, there have been no studies of which we are aware that would indicate what, if any, effect results from the dispersion, and possibly mixing, of these oil slicks which do not wash ashore. St. Amant 3/ states that continuing, low-level pollution associated with intensive oil production ..... in Louisiana has existed for more than thirty years, and further on says that there are numerous local areas of intensive petroleum production where chronic oil loss and mechanical obstructions have resulted in a biological desert ..... St. Amant also refers to the addition of diesel oil to drilling mud. In view of this we believe that there is a need for an extensive monitoring and sampling of sediment and bottom dwelling organisms in a grid around long-used platforms and in "virgin" areas to gain some insight into the extent of low-level contamination in offshore waters. On page 47 the discussion on effect of placing pipelines ashore should refer to St. Amant 3/ who includes effects of pipeline construction in his paper on effects of oil in Louisiana.

Addendum to the Final Environmental Impact Statement

In the addendum are given a number of alternatives with a discussion of theramifications of each. There is no summation of all of the alternatives - those in the Statement as well as in the addendum - and no ranking of these alternatives in terms of environmental impact.

3/ St. Amant, Lyle S., Impacts of Oil on the Gulf Coast, in: Transactions of the thirty-sixth North American Wildlife and Natural Resources Conference. Pp 206-219

Notice for the Federal Register

The Notice lists all of the tracts (referenced as blocks on a map) that are included in the sale. However, the map included with the Final Statement has several blocks marked which are not listed - block 73 in Map 9A, 147, 148 and 151 in Map 10. We can not ascertain whether they were deleted or unintentionally omitted.

The map itself bears no date and therefore, it is difficult to compare it with other, and larger versions of the lease sale area.

OFFICE OF THE DIRECTOR

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON, D.C. 20240

May 19, 1972

Memorandum

To : Director, Bureau of Land Management

From : Director, Bureau of Mines

Subject: Draft environmental impact statement on proposed oil and gas general lease sale offshore Eastern Louisiana

Supplementing our memorandum on this subject of April 14 to Donald Truesdell and pursuant to discussions by Bureau of Land Management and Bureau of Mines personnel on May 17, additional suggestions are enclosed for revision of the subject statement.

Director

Enclosure

SUGGESTIONS FOR CHANGES IN DRAFT ENVIRONMENTAL IMPACT STATEMENT ON PROPOSED OIL AND GAS GENERAL LEASE SALE OFFSHORE EASTERN LOUISIANA

Change alternative 1 to "Increased imports of oil, natural gas, liquefied natural gas, and petroleum products."

Change alternative 2 to "Increased onshore oil and gas production, including fluid injection, explosive fracturing, and production from tar sands and heavy-oil deposits."

Add alternative 9, "Synthetic gas from naphtha, LPG, and coal."

ALTERNATIVE 1

Imports from Canada

One possibility is to increase imports of natural gas from Canada. It is unlikely that this will have much of a short-term (to 1980) impact, however. The Interior Department has analyzed (1,2) the situation as follows:

> "Current imports of gas by pipeline from Canada are about 800 billion cubic feet annually. This supplies about 3.5 percent of domestic demand.
>
> "The future availability of Canadian natural-gas supplies to U.S. markets will depend on Canada's own domestic supply-demand position. Canadian policy in this regard has been to export only that gas which is determined to be surplus to Canada's own requirements projected over a 25-year term. In November of 1971, the Canadian National Energy Board dismissed applications to export gas to the United States amounting to 2.6 trillion cubic feet, based on its conclusion that at that time there was no exportable surplus.
>
> "The Canadian National Energy Board has forecast that, at most, Canada will be able to supply us with not more than 2.3 trillion cubic feet of gas in 1980."

The National Petroleum Council (3) has estimated natural-gas imports in trillions of cubic feet, from Canada as follows: 1975, 1.15; 1980, 1.15; 1985, 1.15.

Imports of Liquefied Natural Gas (LNG)

As of February 1972 (4), applications had been filed with the Federal Power Commission (FPC) by two companies for the import of 1,042 million cubic feet (MMcf) of LNG daily from Algeria. In March one application was approved by FPC (5), that by Distrigas Corp. for the import of 15,400 MMcf per year. Estimated rates to distributors range from $1.07 to $1.74 per MMBtu. In addition, seven other prospective applications were identified by FPC for the import of 4,423 MMcf daily. Thus, imported LNG could be a partial near-term alternative to the proposed lease sale but at a significant increase in the cost of gas to consumers, estimated to range from $0.54 to $1.70 per MMBtu.

Imports of Petroleum Products

One of the supplementary sources of natural gas now being considered for alleviation of the short-term need is synthetic gas from naphtha or liquefied petroleum gases (LPG). This is discussed later under alternative 9.

ALTERNATIVE 2

Stimulation of Petroleum Production

The current efficiency of production of petroleum by all methods, primary and stimulative, averages about 30 percent of the original oil in place. It generally is estimated that the efficiency of production is increasing at about 0.5 percent annually. It is apparent that even a minimal increase in production efficiency, when applied to the 28.5 billion barrels of domestic reserves in the "lower 48" States, could contribute to augmenting domestic supplies. In addition to proved reserves, it has been estimated (6) that the location is known of some 60 billion barrels of oil that is not economically producible now but would be if either:

(1) Wellhead crude-oil prices increased 20 to 30 percent or (2) appreciable increases in production efficiency were attainable through new or greatly improved technology. Another estimate (7) cites a resource of 106.8 billion barrels of heavy crude oil (API gravity of 25° or less), with only 5.2 billion barrels considered to be reserves (economically recoverable with present technology).

Fluid Injection

About 28 percent of our total domestic oil is produced by fluid injection, including gas drive, waterflooding, in situ combustion, miscible fluid displacement, steam drive and cycling, and polymer injection. In some states, fluid injection accounts for 75 to 95 percent of total oil production. One authority recently estimated (8) that, by 1980, 80 to 85 percent of the petroleum produced in the United States will be from waterfloods.

For fluid injection to have any appreciable impact on increasing the availability of domestic petroleum would require either: (1) An increase in the wellhead price of crude oil or (2) an appreciable increase in recovery efficiency, brought about by an increased R and D effort. In either instance, it is probable that the time lag would be 5 years.

Stimulation of Natural Gas Production Through Explosive Fracturing

For natural gas, the production efficiency is considerably higher, approaching 75 percent. However, there are appreciable domestic deposits of natural gas in formations having permeabilities so low that it has not been possible to produce the gas economically with existing methods of well completion. The Bureau of Mines has estimated (9) that some 317

trillion cubic feet might be recoverable from deep, thick, low-permeability formations in Rocky Mountain Basins alone through nuclear-explosive fracturing, should this stimulative method prove to be technically feasible, economically practicable, and publicly acceptable. Also, there are many other shallower, thinner, tight formations from which gas might be producible economically through a combination of hydraulic and chemical-explosive fracturing, especially if advantage is taken of the orientation of natural and induced subsurface fractures.

The situation with regard to stimulating natural-gas production from tight formations through explosive fracturing, however, is similar to that of stimulating petroleum production through fluid injection. Either an increase in the wellhead price for natural gas or an accelerated R and D effort would be required and, in either case, a lead time of 5 years can be assumed.

Production of Oil from Tar Sands and Heavy Oil Deposits

Tar sands represent one domestic resource that has not been utilized, even though one large-scale operation is in progress, producing from the Athabasca tar sands of Alberta, Canada, and another, larger one has been authorized. The reasons for this apparent anomaly are that domestic tar sands are neither as geographically nor geologically concentrated as the Athabasca deposits and, until recently, we have had adequate supplies of relatively cheap petroleum and natural gas.

The term "tar sands," as used in numerous reports, is applied to a variety of rock types that contain some form of bituminous material. Although the term is useful in describing the appearance of certain rocks and associated viscous hydrocarbons, it is a misnomer. Tar is a refined

product and sand is unconsolidated. The rocks to be discussed in this appraisal contain natural bitumen and may be composed of something other than sand-size particles. The term bitumen-bearing rocks is more appropriate. Bitumen-bearing rocks are here defined as consolidated and unconsolidated rocks with interstices that contain very viscous to semi-solid to solid bitumen which, in its natural state, cannot be recovered by primary petroleum-production methods. Included are rocks that have been called tar sands, oil-impregnated rock, bituminous sandstone, bituminous limestone, and rock asphalt.

Heavy-oil sands, as distinguished from tar sands, represent those deposits from which production has been limited because of the low gravity and high viscosity of the oil. The Bureau of Mines (7) estimated our domestic heavy-crude-oil resource on January 1, 1966, to be 106.8 billion barrels, of which 45.9 billion barrels was in reservoirs considered to be most favorable for thermal-recovery operations. The estimated proved reserve at that time was 5.2 billion barrels and the cumulative production for the preceding decade was more than 3 billion barrels.

The technology that might be applicable to producing oil from tar sands would essentially be the same as used for heavy oil sands. This might involve mining the deposit and extracting the oil aboveground or in situ methods, such as in situ combustion, the injection of hot fluids, and solvent extraction.

As in the situation with fluid injection and explosive fracturing, either an increase in the wellhead price of heavy oil or greatly improved technology resulting from an accelerated R and D program, or both, would be required for oil from tar-sand and heavy-oil deposits to make any

appreciable impact on domestic supplies. The lead time is estimated at 5 to 10 years.

ALTERNATIVE 9

Synthetic Gas from Naphtha and LPG

More than a dozen applications have been made for quotas for importing naphtha or other feedstocks for making synthetic (or substitute) natural gas (SNG) (10,11). Most of the applications are for importing naphtha, although others are for LPG and crude oil. This subject is extremely controversial at the moment because approval of applications would significantly increase imports and other users of naphtha, such as petrochemical manufacturers, fear that shortages of naphtha would thus be created. Estimated costs for SNG (11) range from $1.00 to $1.60 per MMBtu.

Synthetic Gas from Coal

The factors that primarily concern the manufacture of syntehtic fuels from coal are the relatively large supply of coal, the limited supply of gas and oil in the United States, the changing economics of fuels, and the problems of air pollution by particulates and sulfur in coal combustion, a type of pollution that can be avoided by conversion to clean-burning synthetic fuels.

For a number of years, the Department of the Interior, through the Office of Coal Research and the Bureau of Mines, has been working with the natural gas and coal industries on several processes which are in or ready to go to a large pilot plant stage. The status of these processes is summarized below.

Status of Coal Gasification Processes

Process	Laboratory	Sponsor	Status of Pilot Plant	Federal Funding[1/] Fiscal Year 1972
HYGAS (Electrothermal)	Institute of Gas Technology	Office of Coal Research-American Gas Association	Starting Operation	$3,500,000
HYGAS (Oxygen)	Institute of Gas Technology	American Gas Association	N.A.	
CSG (CO_2 Acceptor)	Consolidation Coal Company	Office of Coal Research	Building	3,420,000
SYNTHANE	BuMines	BuMines	Being Designed	1,500,000[2/]
BI-GAS	Bituminous Coal Research	Office of Coal Research-National Coal Association	Being Designed	3,300,000
STEAM IRON	Institute of Gas Technology	Industrial	N.A.	
FIXED BED	BuMines LURGI	BuMines	Pilot Unit in Operation; Commercial Plant on Non-Caking Coal, Low Btu Gas	750,000

N.A. Not available.

1/ Funding authorized for pilot plant work, additional funds for laboratory research.

2/ In addition, contracts totaling $1,245,000 were let in June 1971 for designing the pilot plant and for renovating and operating an intermediate sized industrial gasifier pilot plant.

Estimates for the cost of a plant to process 250 million cubic feet per day are about $180 million, including the coal mine. Recent estimates by the Office of Coal Research, and the Bureau of Mines, using utility-type economics, project a selling price for the gas at about 64 cents per MMBtu at the plant. Columbia Gas Systems recently cited a figure of 85 cents with coal at $5.50 per ton (12). A precise cost figure depends on the particular coal used and on the method of economic evaluation. Those quoted here do illustrate approximate values expected.

The plan for the development of new coal gasification processes consists of the construction and operation of several pilot plants by 1974 or 1975. The results of these pilot plants can then be evaluated and one or more demonstration plants constructed by about 1978.

It is apparent that coal gasification may be expected to serve the Nation's intermediate-term needs but not the short-term needs. The comparatively high cost of synthetic gas from coal also needs to be considered.

REFERENCES

1. U. S. Department of the Interior. United States Energy, A Summary Review, January 1972, p. 22.

2. Statement of the Honorable Rogers C. B. Morton, Secretary of the Interior, before the Committee on Interior and Insular Affairs, June 15, 1971, p. 17.

3. National Petroleum Council. U.S. Energy Outlook, An Initial Appraisal, 1971-1985, July 1971, Table VII, p. 31.

4. Federal Power Commission. National Gas Supply and Demand. Staff Report No. 2, February 1972, Table 8, p. 71.

5. First Long-Term LNG Import Cleared. Oil and Gas J., v. 70, No. 12, March 20, 1972, pp. 18-19.

6. Elkins, L.E. New Recovery Plans Key to 60 Billion Barrels. World Oil, v. 1972, No. 7, June 1971, pp. 69-72.

7. Petroleum Staff, Mineral Resource Offices. Heavy Crude Oil, Resource, Reserve, and Potential Production in the United States. BuMines Inf. Circ. 8352, 1967, 76 pp.

8. Craig, F. F., Jr. The Reservoir Engineering Aspects of Waterflooding Presented, Golden Gate Section, Society of Petroleum Engineers, AIME, San Francisco, Calif., May 1972.

9. Atkinson, Charles H. The Concept and Testing of Formation Fracturing with Nuclear Explosives, and Thoughts on Future Applications. Proc. 4th Petroleum Economics and Evaluation Symp., Dallas Section, Society of Petroleum Engineers, AIME, 1968, SPE Paper 2061, 1968.

10. SNG, LNG Proposals Fire Controversy. Oil and Gas J., v. 70, No. 7, February 14, 1972, pp. 47-48.

11. SNG, LNG Raise More Questions Than Answers. Petroleum Independent, v. 42, No. 5, March-April 1972, pp. 8-9.

12. Mills, G. Alexander. Conversion of Coal to Gasoline. Ind. Eng. Chem., v. 61, No. 9, 1969.

OFFICE OF THE DIRECTOR

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON, D.C. 20240

April 14, 1972

Memorandum:

To : Donald Truesdell, Branch of Marine Minerals, Bureau of Land Management
Through: Assistant Secretary--Mineral Resources 4/19/72

From : Director, Bureau of Mines

Subject: Review of draft environmental statement on proposed oil and gas general lease sale offshore Eastern Louisiana

As requested in the memorandum of March 30 from the Director, Bureau of Land Management, to other Agency Directors, we have reviewed the subject draft.

We are aware that the principal purpose of the requested review was to obtain substantive, rather than minor, comments. However, in the review process, our engineers noted numerous typographical errors and minor questionable points. These have been indicated in the text of one copy, which is being returned to you with this memorandum, and may be helpful in preparing a final draft.

In addition, we do have three general comments. On page 101, alternatives to the proposed lease sale are discussed and a distinction is made between true alternatives and supplementary sources of fuels. Inasmuch as we now are looking toward all sources of energy for the short-term, intermediate-term, and long-term alleviation of current fuel shortages, we doubt that this distinction is valid. In particular, we suggest that the following alternatives be added:

9. Increasing gas imports from Canada.
10. Importing liquefied natural gas.
11. Synthesizing gas from naphtha.
12. Increasing stimulation of oil and gas production from known deposits.
13. Synthesizing gas from coal.

The first four of the suggested additional alternatives might contribute to short-term alleviation and the last to intermediate-term alleviation of fossil fuel shortages.

On page 177, where in situ coal gasification is discussed, you may wish to call attention to the fact that this process does not yield pipeline-quality gas but a low Btu "producer" gas that might be used for power generation.

On page 205, it is stated that average wellhead prices of gas for interstate shipment have increased from $0.18 to $0.245/mcf during the past 2 years. The Bureau of Mines Minerals Yearbook cites average wellhead prices of domestic gas as: (1) 1969, 16.7 cents/mcf and (2) 1970, 17.1 cents/mcf. Our preliminary estimate for 1971 is 17.5 cents/mcf. These averages include intrastate, as well as interstate gas.

Acting Director

Enclosure

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO:

MAY 12 1972

Mr. Donald Truesdell
Bureau of Land Management
United States Department
of the Interior
Washington, D. C. 20240

Dear Mr. Truesdell:

We appreciate the opportunity to comment on your draft environmental statement dated March 31, 1972, covering a proposed Outer Continental Shelf oil and gas general lease sale of 78 tracts of submerged lands offshore Eastern Louisiana. As you know, the Commission is and has for sometime been actively directing its attention and efforts toward those regulatory actions which will improve the current imbalance between natural gas supply and demand. The Commission has taken a number of steps to stimulate exploration and development in addition to other actions designed to bring market demands more nearly in line with available supplies. We view the proposed lease sale as having the potential for improving the supply situation for both oil and natural gas. We, of course, recognize that there may be potentially detrimental environmental effects to be considered and evaluated. It is important that a balanced approach be followed which will achieve needed resource development and the raw energy supplies to meet our social and economic objectives, at the same time giving full consideration to environmental interests.

The Commission staff has reviewed the draft environmental statement and their comments are attached for your consideration. Based upon an evaluation of these comments, we concur

with the conclusion that a balancing of the national interests appears to support conducting the proposed lease sale.

Sincerely,

John N. Nassikas

John N. Nassikas
Chairman

Enclosure

FEDERAL POWER COMMISSION

STAFF COMMENTS

ON

DRAFT ENVIRONMENTAL STATEMENT PREPARED BY DEPARTMENT OF INTERIOR REGARDING PROPOSED OUTER CONTINENTAL SHELF OIL AND GAS LEASE SALE COVERING 78 TRACTS

DRAFT STATEMENT CIRCULATED PURSUANT TO SECTION 102 (C) OF NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Washington, D. C.

May 3, 1972

Comments on Draft Environmental Statement

By letter received in the Commission on March 31, 1972, the Bureau of Land Management, U. S. Department of the Interior, circulated for comments a draft environmental statement dated March 31, 1972, covering a proposed Outer Continental Shelf oil and gas general lease sale of 78 tracts of submerged lands offshore Eastern Louisiana. The sale area under consideration totals 366,440 acres from the Ship Shoal Area eastward through the Main Pass South and East Addition and covers an area 230 miles long with tracts ranging to 60 miles from shore. The leases are located from 3.5 to 69 statute miles offshore in water depths that range from 15 to 510 feet.

The draft statement points out that 17 percent of the 78 tracts are expected to be primarily gas productive, 47 percent are expected to be primarily oil productive and the remaining 36 percent are anticipated to have both oil and gas potential. It is estimated that the proposed leases will ultimately produce 825 million barrels of oil and 1.75 trillion cubic feet of gas.

If the estimated 1.75 trillion cubic feet of natural gas is not produced from this proposed lease sale it will be necessary to provide the required energy to the market by utilizing an alternate fossil fuel. If bituminous coal were used as an alternate energy source 69,130,000 short tons would be required. Alternately 288,100,000 barrels of residual fuel oil would be required to provide an equivalent amount of energy

The following table illustrates the amount of air pollution emissions that would result from combustion of these alternate fuels.

	Particulates (Short Tons)	Sulphur Oxides (Short Tons)	Nitrogen Oxide (Short Tons)
Natural Gas	-0-	-0-	175,000
Bituminous Coal	87,500	1,050,000	612,500
Residual Fuel Oil	87,500	700,000	262,500

Of major concern to the Federal Power Commission is the deteriorating gas supply situation. Reserve data supplied by interstate pipeline companies in their FPC Form 15 reports have indicated declines of 3.4 and 7.3 trillion cubic feet for the years 1968 and 1969, respectively. The report, based on gas supply and deliverability information filed by the pipelines, said that after deductions for production and purchases, the remaining year-end 1970 reserves were 173.6 trillion cubic feet, a net decline of 17.9 trillion cubic feet, or 9.3 percent, from the 191.5 trillion cubic feet in 1969.

Data from the American Gas Association, which includes information on reserves of both interstate and intrastate companies, gives similar indications. The increasingly sharper rates of decline in deliverability since 1963 indicate that historically, reserve additions have been insufficient to offset the continued steady increase in market requirements. This has caused increased volumes of gas from present sources to be scheduled for delivery in earlier years and consequently earlier and more rapid decline in deliverability. As of year end 1970, based on dedicated reserves, a 10 percent decline in projected deliveries would occur in the fifth year, or 1975. However, assuming a continuation of present trends of reserve additions and increasing market requirements, a 10 percent deficiency is indicated in the ability of interstate pipeline companies to meet requirements on an annual basis at an even earlier date.

There is constantly increasing evidence that the gas supply situation is worsening. Increasing applications to the FPC for authority to import gas from Canada and other foreign sources along with receipt of several applications to synthesize natural gas substitutes indicate that domestic demand is not being met by domestic supply. Additionally, the shortage of natural gas supply is evidenced by the fact that seven of the major gas pipeline companies curtailed gas deliveries below contract volumes during the 1971-72 heating season. A survey of the 50 states and four territorial regulatory agencies conducted by a subcommittee on gas of the National Association of Regulatory Utility Commissioners, in late 1971, resulted in responses from 44 addressees. On the whole, states with sizeable natural gas production and/or small population or little industrialization tend not to report natural gas shortages or massive programs to meet existing or anticipated shortages. Thus Kansas, Montana,

Oregon, Oklahoma, Texas, Utah, Vermont, Wyoming and Louisiana are taking only minor action, if any, to meet slight or nonexistent gas shortages. On the other hand, heavily industrialized eastern and midwestern states, including Delaware, Illinois, Michigan, New Jersey, Pennsylvania and New York have major programs to counter gas shortages, as have Arkansas and North Carolina in the south. Further evidence of the worsening supply situation being faced by the interstate pipeline companies is provided by the fact that almost three-quarters of a billion dollars have been advanced or committed to producers by the pipeline companies for the purpose of exploring for and developing new gas reserves. Advances for activities in the Southern Louisiana area account for about 45 percent of the total.

It should also be noted that, according to information furnished the Federal Power Commission and placed in it's public files, there is substantial excess capacity in the existing lines in the Offshore Louisiana Area. Three pipelines, Texas Eastern Pipeline Company, Trunkline Gas Company and Southern Natural Gas Company have lines in the immediate vicinity of this proposed lease sale with substantial excess capacity in their existing offshore lines.

The importance of the South Louisiana production area, both onshore and offshore, to the nation's natural gas supply cannot be over emphasized. In terms of production, this area which contributed about 13 percent of the gas produced domestically in 1956, had increased its share to about 39 percent of all gas sold in the interstate market by 1970. Moreover, while less than 1 percent of the total natural gas supply was obtained from Outer Continental Shelf (OCS) production in 1956, these areas in 1971, provided almost 13 percent of the total U. S. natural gas production, these figures include production from all OCS leases not only Louisiana offshore. The major role played by Louisiana's offshore Federal domain is also easily seen in the fact that it contains more than 92 percent of the nation's 1971 oil and gas productive OCS acreage, about 84 percent of 1971 OCS leases and about 96 percent of 1971 OCS oil and gas wells.

The draft statement points out that the demand for natural gas is expected to increase at a 3.8 percent average

annual rate through 1985 due in large part to its low sulphur content. In its Southern Louisiana Area Rate Opinion No. 598, issued July 16, 1971, the Commission emphasized the importance of developing this area's reserves in pointing out:

> "Our minimum objective has to be action to halt and hopefully to reverse the downward trend of the reserve-to-production ratio. It is from the Southern Louisiana area that we reasonably can expect the greater portion of total demand for jurisdictional gas to be satisfied in the next few years."

To this end the Commission prescribed rates designed to provide an economic stimulus toward increased exploration and development of offshore Louisiana reserves. The absence of alternative supply areas as well as the concurrent shortage of alternative fuels accentuates the need for orderly and controlled expansion of leasing operations in the offshore area. Moreover, the presence of production from tracts adjoining the subject leases as well as the existence of an operational pipeline network should minimize the time required to bring the resources to maturity. The seriousness of the situation demands that priority be given to those actions which have the potential for quick results.

In acting to alleviate the growing shortage of natural gas and other fuels, appropriate consideration must be given to the environmental implications of such actions. Section 102(B) of the National Environmental Policy Act (NEPA) required that all Federal agencies give appropriate consideration to environmental as well as economic and technical factors in the decision making process. It is necessary, therefore, that a balanced approach be followed which will achieve needed resource development while at the same time protecting the environment. One of the stated purposes of NEPA is to encourage productive and enjoyable harmony between man and his environment.

A narrow interpretation of the NEPA mandate will not achieve that balance and will not, therefore, best serve the public interest. A multitude of environmental factors must be considered extending from the local areas where the resource development and production activities take place to the ultimate markets where the resource is consumed.

The availability of fuel for heating homes, cooking meals and supplying energy for the manufacture of products and the generation of electricity certainly contributes to man's environment. Because of its clean burning characteristics, natural gas is a premium fuel in the battle to preserve and improve the quality of the air. The state of present technology still leaves much of the burden for protecting the atmosphere to the utilization of low sulfur fuels including natural gas. The following comments on the specifics of the draft statement reflect this broad approach to environmental considerations.

(i) Environmental impact of proposed actions

It is indicated that operations under the proposed leases could have an impact on the environment in three major ways:

(a) debris from oil and gas drilling operations and pipeline construction,
(b) construction of platforms, pipelines and other structures,
(c) pollution from oil spills and disposal of waste water.

Since present regulations governing oil and gas operations on the Outer Continental Shelf strictly prohibit dumping of debris and require that well abandonment include the removal of submerged structures, little or no environmental impact should be experienced in this area of concern. Regarding the construction of structures which extend above the surface of the water, these structures provide artificial reefs for fish and other sea life as well as navigational and emergency aid to vessels in distress. They can also pose navigational hazards and, principally at shallow water depths, these structures can interfere with commercial fishing operations. The bulk of commercial fishing in the Gulf of Mexico occurs in water depths less than 60 feet whereas all but three of the leases are located in waters in excess of 65 feet. The draft statement indicates that there are approximately 987 platforms and other structures presently in existence in the proposed lease sale area. It would thus appear that the estimated 70 to 120 additional structures which may be necessary to develop the proposed tracts would be so located as to avoid any substantial adverse impact upon shipping or commercial fishing operations.

The draft statement advises that an estimated 36 pipelines totaling 230 miles would be required to transport the new oil and gas production to shore. It is not clear whether this gives consideration to the existing pipeline network. The environmental impact of the transportation operation can best be determined by an evaluation of (a) the potential for utilizing the existing offshore pipeline network, and (b) the routing of any additional facilities that would be required. Information on file with the Commission indicates that there are existing or proposed natural gas pipelines near a majority of the subject leases. To the extent that these presently existing pipelines can be utilized, adverse effects associated with the transportation operation can be minimized or avoided completely. If additional pipeline facilities will be needed which will extend from one offshore platform to another, it should be possible to avoid any significant adverse environmental effects. The construction of pipeline facilities to transport gas or oil from offshore to onshore has other environmental implications; however, by using proper construction techniques and locating the pipelines in areas of minimal environmental significance, most adverse effects can be avoided. For example, pipelines can be and generally are routed around shell fisheries and wildlife refuges; marshlands can be restored and spoil banks which may change the natural flow of water can be removed; onshore compressor facilities can be located and constructed with the necessary measures to avoid unacceptable noise levels. Therefore, the transportation operation does not necessarily generate adverse environmental effects. In any event, any construction would require certification by the FPC and an opportunity would be available to examine specifically any potential adverse environmental impact.

Contained in the draft statement is a comprehensive discussion on the possible adverse effects upon the ecology of the Louisiana offshore and coastal areas should an oil spill occur. Inasmuch as the full effects of oil spills on a given ecosystem at the various trophic levels are poorly understood, the suggestion that extensive studies be made in those areas containing a high risk factor for oil spillage appears reasonable and desirable but should not delay the authorization of the lease sale and the development of the much needed energy supplies.

The Department of Interior expects to achieve cleaner and safer offshore and coastal operations through its programs. Through the efforts of Interior and other Federal, state and local agencies, by advances in industrial technology, and through the strict enforcement of Outer Continental Shelf operating regulations and orders, supplemented by effective contingency actions in the event that spills should occur as a result of natural disasters, human error, or equipment failure, it appears reasonable to conclude that the potential for oil pollution problems associated with the subject leases can be minimized.

(ii) Unavoidable adverse environmental effects

Four unavoidable adverse effects from this proposed lease sale are identified in the draft statement:

(1) Possible major oil pollution can result from natural disaster, equipment failure, or human error. However, the probability of such accidents can be minimized by stringent enforcement of regulations, advances in industrial technology, and advances in spill containment and removal technology.

(2) Some additional oil will be discharged into the Gulf of Mexico as a result of normal drilling, producing, and transportation operations on, or associated with, the proposed leas This can be minimized through complete compliance and enforcement of the lease requirements and operating regulations.

(3) The development of the proposed leases will add some further interference with commercial fishing. By approving only structures absolutely needed for proper development of a tracts, conflict with commercial fishing can be minimized. Also, since the bulk of the leases are located in water depths greater than 60 feet, they offer little potential for adversel affecting fishing operations.

(4) Additional pipeline construction will contribute to further marsh destruction. Depending on the methods employed in laying pipelines, the statement indicates that these advers effects may be either short-term or permanent, and may be mino or serious. However, these effects can be substantially reduc be careful advance planning and utilization of the appropriate construction techniques. Moreover, any adverse impact may be totally avoidable by using existing pipeline networks or estab- lished pipeline corridors. Existing pipeline canals should be

tilized wherever possible and bulkheads, properly placed, an prevent salt water intrusion and maintain existing rainage and water-exchange routes. Pipelines should be nd generally are routed around major oyster reefs and, in rossing shallow estuarine areas, care should be taken to revent the existing bottom from being elevated or segmented y spoil banks. Utilization of these techniques should min- mize any adverse effects that could result from construction f pipelines from offshore to onshore.

(iii) Alternatives

The draft environmental statement discusses several alternatives to the proposed lease sale identified under three overall categories: (a) Hold the sale in modified form, (b) Withdraw the sale and, (c) Delay sale.

A modified form of lease sale arrangement would certainly be preferable to no sale or a delay of the sale. The tracts with oil potential which lie in close proximity to wildlife refuges and other such tracts which pose significantly greater risks to fish and wildlife resources and recreation areas might possibly be deleted from the sale at this time. Tracts located in areas of high hazard potential, such as is found where unconsolidated sediments are being actively deposited, or those in known zones of instability as well as those tracts in shipping fairways or designated anchorages which will not ultimately be relocated by the U. S. Army Corps of Engineers might also be deleted from the sale. However, before any such decision is reached careful analysis should be made of the probability for adverse effects occurring in view of the capability of avoiding most such effects.

Withdrawal of the tracts from consideration for leasing because of the resulting environmental impacts is proposed as a second alternative. If such a decision were to be made either it would be necessary to reduce energy demands or develop new domestic sources of clean energy. Increased oil imports, increased onshore oil and gas production, increased nuclear power generation, increased use of coal, increased hydroelectric power, modification of FPC natural gas pricing, modification of market demand proration system and oil shale production are all considered in the statement as possible alternate energy sources for short-run needs. Elimination of oil import quotas involves a number of complex factors, the consideration of which makes

any such step unlikely as a partial solution to our energy needs in the short run. The remaining alternate energy sources are possible means of meeting energy requirements but their potential also exists for the future; time, cost and technology dictate that immediate energy requirements be met through conventional means on a current and continuing basis.

The statement points out that there appears to be a consensus that increased prices should provide the necessary incentives to accelerate the exploration and development of additional resources.

The Federal Power Commission, on July 16, 1971, in its Opinion No. 598, in a major step to deal with the critical shortage of gas in the United States, set new, higher ceiling rates for the South Louisiana area and provided for a system of incentives to promote dedication of gas reserves to the interstate market.

The Commission said that the evidence supports the conclusion that there is, "a worsening gap between supply and demand, and that price must have a major responsibility for eliciting new supplies." Demand for gas as a "pollution-free fuel" is increasing and the price of alternative fuels is going up, the FPC pointed out.

The Commission said its rate for new gas in South Louisiana is consistent with nationwide costs. It said it was mindful of the importance of South Louisiana as a source of new gas supplies both in terms of future production and potential for discovery.

In furtherance of the concept of providing incentives the Federal Power Commission has recently, April 6, 1972, instituted a proposed rulemaking and statement of policy relating to an optional procedure for certificating new producer sales of natural gas. This is intended to provide an alternate method to stimulate and accelerate domestic exploration and development of the nation's natural gas reserves. The proposed alternate procedures are designed to assure interstate gas consumers, and the nation as a whole, an adequate and reliable supply of natural gas at the lowest reasonable cost and will be available only to producers bringing new supplies of natural gas to the interstate market. This proposed new section of the Commission's Rules is not intended to replace geographical area

pricing, but rather will provide, if approved, an alternative procedure for certification of natural gas sales for new gas sales at rates above established area ceilings.

On page 122 of the draft statement the explanation of Table 2 states,"We assume, in this analysis, that oil must substitute for gas because gas is not now available from foreign sources." It is suggested that there is natural gas available for import both in gaseous and liquefied states. Your attention is directed to the FPC publication "National Gas Supply and Demand 1971-1990 - Staff Report No. 2" which in Table 8, page 71 contains the following information concerning proposed LNG Import Projects:

Table 8

FILED AND PROSPECTIVE CONTIGUOUS UNITED STATES LNG IMPORT PROJECTS

Project Coordinator[1]/Source Importer/Destination	Average Daily Volume (Million Cubic Feet)	Year of Initial Delivery
Filed		
1. Distrigas Corporation/ Skikda, Algeria Distrigas Corporation/ Everett, Mass., and Staten Island, N. Y.	42 [2]	1971
2. El Paso Natural Gas Company Arzew, Algeria		
Columbia LNG Corporation/ Cove Point , Md.	300	1975
Consolidated System LNG Company/ Cove Point, Md.	350	1975
Southern Energy Company Savannah, Ga.	350	1975
Prospective		
1. Distrigas Corporation/ Skikda, Algeria Distrigas Corporation/ East Coast	123 [2]	1975
2. El Paso Natural Gas Company Algeria Consolidated System LNG Company/ East Coast	500 [3]	1977
3. Phillips Petroleum Company/ Nigeria or North Sea Unknown/ East Coast	1,000	1976-1977 [4]

(Table 8 Continued)

4.	Shell International Gas Company/ Nigeria Unknown/ East Coast	650	1978
5.	Standard Oil Company (Indiana)/ Trinidad Unknown/ East Coast	450	1976-1977 4/
6.	Venezuelan Government/ Venezuela Unknown/ East Coast	1,300	1975
7.	Pacific Lighting Corporation/ Alaska Pacific Lighting Corporation/ California	400 5/	1975

1/ Company most often associated with the project
2/ Converted from annual volume based on a 365-day year
3/ 150 to Consolidated; 350 uncommitted
4/ Estimated by allowing approximately six years for project development
5/ Estimated

Sources: FPC Files; Trade Journals; Newspapers; Personal Communications

However, as attractive a short-term expedient as the importation of natural gas might be, it still is not expected to diminish the need for increased domestic production.

As a final alternative it was indicated that the proposed lease sale could be delayed until production, pollution containment, and marine resources protection technology is further developed. However, inasmuch as adequate technology to safeguard the environment is presently available, provided its application and use are properly regulated, there appears to be no advantage in postponement. Further, postponement of the sale would contribute to the growing energy shortage and would only defer any local environmental impact. It is even conceivable that postponement would increase the local effects since alternative fuels would be used which have their own environmental impacts.

(iv) Relationship between local short-term use of man's Environment and maintenance and enhancement of long-term productivity

The use of these leases for the production of oil or natural gas will benefit the environment of the areas where the fuel is consumed. On the other hand, the only effect upon the acreage itself will be the depletion of a natural resource.

(v) Irreversible or irretrievable commitment of resources

It appears reasonable to conclude that the only irreversible or irretrievable commitment of resources would be the natural gas or oil reserves produced.

Conclusion

The National Environmental Policy Act stresses the need for a balanced approach toward resource development and protection of the environment. From the foregoing evaluation, it appears that the proposed lease sale would provide such a balance between the need for natural gas and oil, the environmental and other benefits to be derived from their availability for consumption, and the minimal adverse environmental effects that might, but not necessarily will, occur in the local areas contiguous to the leases.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 25 1972

Mr. Burton Silcock
Director
Bureau of Land Management
U.S. Department of the Interior
Washington, D. C. 20240

Dear Mr. Silcock:

Enclosed are EPA's comments on the draft Environmental Impact Statement for the Proposed 1972 Outer Continental Shelf Oil and Gas Lease Sale Offshore Eastern Louisiana.

We appreciated the opportunity to review and comment on the draft Statement. We would appreciate receiving a copy of the final Environmental Impact Statement when it is available. If we can be of any further assistance, please contact us.

Sincerely,

Sheldon Meyers

Sheldon Meyers
Director
Office of Federal Activities

Enclosure

411

COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT
PROPOSED 1972 OIL AND GAS LEASE SALE
OFFSHORE EASTERN LOUISIANA

General Comments

We find the practice of ranking individual tracts on the basis of proximity to high value or beneficial use areas and critically vulnerable resources indicates an improvement in evaluation techniques. However, this practice should be extended to include some analysis of the drilling and production risks on particular tracts and general discussion of tracts in areas of close proximity and high risk.

For example, a number of blocks in the South Pass area are ranked as 7 because of proximity to the Delta Migratory Waterfowl Refuge. Some of these tracts also appear to be in deeper water (pg. 233), some are adjacent to shipping fairways (pg. 73) and some may lie in areas of unstable sediments (pg. 71). The ranking of 7 only reflects proximity to the Refuge and does not reflect spill hazards from these tracts due to depth, shipping, or sediment instability. We suggest that an individual discussion of tracts such as these be included in the Statement since it may be desirable to modify the sale by removing some tracts because of high environmental risk. Reasons should then be given for not withdrawing tracts that are both near vulnerable areas and exhibit high risk.

Specific Comments

1) Page 3, paragraph three. The Interior Department states that two general sales of 300,000 to 600,000 acres each are scheduled each year. We would request the rationale behind the acreage figures presented.

2) Page 11, Commercial Fishing. The statistics presented in this paragraph should be updated to reflect 1971 data.

3) Page 15, General Summary of Environmental Impacts Which Might Result From OCS Oil and Gas Operations. The category of "shellfish" should be added to the list of "impacted factors". To the extent that platform operations have a negative effect on beaches (other than the aesthetics of being seen from a beach), they also have a negative effect on refuges, estuaries, and marshlands.

4) Page 51, paragraph four, Oil Pollution. The first sentence should be expanded to include environmental impacts from polluting materials

other than oil. Drilling and production operations threaten the aquatic environment with pollutants in addition to oil. Examples of pollutants other than oils could be polychlorinated biphenyls (PCB's) from heat exchange units; waste solids disposal; disposal of waste produced brine water as a carrier for remnant inorganics; increased biological and chemical oxygen demand.

5) Page 61, Waste Water. The Impact Statement reflects only the waste water discharged from OCS production. Mention should be made of waste water produced on State lands. To look at OCS discharges only would give a false impression of the oil pollution load from production brine waters that the Gulf must carry (EPA estimates brine water production of State waters at approximately 3,300,000 bbl per day).

We feel that the effluent waste water limit permitted by OCS Order No. 8 of 50 ppm does not necessarily reflect the best waste water treatment technology available.

6) Page 67. The rationale for designating certain areas as 7 on the risk scale appears to be based on transportation time from the production areas to high value areas of eighteen hours with .5 knot currents. Transportation time, coupled with the requirement that the lease operator be required to maintain containment and clean up equipment within twelve hours of the production site would be partly indicative of the environmental risk or safety that the high value areas would enjoy.

A check with NOAA revealed that current velocities of .7 to 1.5 knots are typical in the sale area with 1.5 knots being the most adverse conditions (the EPA remote sensing survey of the Shell fire in the Gulf of Mexico in January 1971 encountered currents up to 0.85 knots). Recalculating proximity of the tract using a 0.7 knot base will bring an additional number of tracts into the 7 risk category. This would also change the tracts affected by the stipulation concerning clean up on page 73.

7) Page 71, paragraph three. The statement that two of thirteen existing platforms off Main Pass were seriously damaged during hurricane "Camille" is misleading. To the best of our knowledge these two platforms failed, i.e., were lost due to bottom movement and have not been recovered. The Environmental Statement should discuss the risks involved on blocks in the area subject to bottom movement.

8) Page 72, third paragraph. "The Regional supervisor may decline to approve the installation of a structure at a site which he determines will unreasonably interfere with other uses of the area." It would help to clarify this responsibility if the statement would spell out what authorities and what other users of the area the Regional supervisor routinely contacts in making this decision.

9) Page 73. This page includes a stipulation applicable to blocks with risk ratings of 7 requiring clean up and containment equipment and discussing its availability and use. Some criteria should be given for spill conditions requiring its deployment: size of the spill, whether it must be threatening a critical use area or any shoreline, etc.

10) Page 75, Regulations. "Compliance with and enforcement of existing regulations will permit exploration, development and production operations to be conducted on the OCS within a low order of environmental risk." The spill data presented in this Impact Statement, coupled with our very limited knowledge at this time of the impact of oil in the Gulf of Mexico does not warrant this statement.

11) Page 75, Operator Inspection and Testing. This paragraph states that frequent inspections of unmanned facilities is required. A definition of "frequent" should be given.

12) Page 77, 8.. Contingency Plans and Equipment. This paragraph states that the operator be required to have pollution control equipment including approved chemical dispersants. Who may authorize the use of chemical dispersants on spills of oil from facilities on the OCS, and under what circumstances are they normally used?

13) Page 80, On-Site Inspection. For adequate prevention and control, we believe more than one inspection should be made to reduce the possibility of pollution from human errors, machinery breakdowns, and spillage of toxic chemicals during drilling operations, especially on wildcat drilling.

14) Pages 90 and 91, Pipeline Construction Effects on Marshes and Bottom Resources. This section mentions the adverse effect of canal dredging for pipeline construction.

It would appear desirable for the Department of Interior to initiate a study at an early date on needed oil and gas trunkline or shared pipeline facilities from tracts identified in this sale and those planned for future sales to minimize this dredging.

EPA should be included among Federal agencies who review and comment on dredging projects in navigable waters in accordance with the Memorandum of Understanding with the Corps of Engineers, dated July 13, 1967.

Bulkheads are mentioned (pg. 90) as a means of preventing salt water intrusion in canals. A recent aerial survey of the Delta area show many such bulkheads to be in a poor state of repair. Without constant maintainance their effectiveness as barriers is much reduced.

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15) Page 97, VI. Relationship Between Local Short-term Use and Maintainance and Enhancement of Long-term Productivity. The second paragraph should be modified to indicate that while the long-term effects of oil spillage are not clearly understood at this time, long-term productivity of fish and wildlife in the area may be reduced due to pollution resulting from the lease sale.

16) Page 99, Irreversible or Irretrievable Commitment of Resources. "The major significance of oil spillage in the marine environment is its potential effect on wildlife, such as waterfowl and other birds, from direct contact, and particularly on the delicately balanced relationships among living things and between living things and their environment." The second part of this sentence does not relate to the first and the first part presents harm from oil spillage in a much too narrow sense.

Current technology is not able to evaluate the long term effects of oil and gas production and related activities on the offshore environment. Continuing research may prove that the continuing spillage of oil and other toxic substances may sacrifice other portions of the total environment of the offshore area in an irretrievable and irreversible manner.

17) Page 100, A. Hold the Sale in Modified Form. Before an assessment can be made of the environmental risk involved on individual tracts (and whether tracts should be withdrawn from the sale) the hazard analysis should be broadened to include things other than proximity to critical or high value use areas. A discussion of individual tracts in risk category 7 should be given with some evaluation of probable platform depth and its risk effect, the nearness to shipping fairways and whether the tract will fall in areas of sediment instability. Not until this is done can a meaningful evaluation of individual tracts be made. This was discussed extensively under the first section, General Comments.

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (WS/83)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

SA 0809

25 MAY 1972

Mr. George L. Turcott
Acting Director
Bureau of Land Management
Department of the Interior
Washington, D. C. 20240

Dear Mr. Turcott:

This is in response to your letter of 30 March 1972 addressed to Mr. Herbert F. DeSimone, Assistant Secretary for Environment and Urban Systems, concerning the draft environmental impact statement on the proposed Outer Continental Shelf oil and gas general lease sale of submerged lands offshore Eastern Louisiana.

The concerned operating administrations and staff of the Department of Transportation have reviewed the draft statement. Noted in the review by the Coast Guard's Marine Sciences Division is the following:

> "No scientific or technical comments are necessary. An operational requirement for the Coast Guard to develop and maintain an 18-hour contingency spill response capability in the Gulf Coast delta region is inferred from material presented on page 67 of the draft."

The following is noted from the review by the Coast Guard's Office of Engineering:

> "Page 85, paragraph G refers to Coast Guard research on containment and recovery devices. The prototype high seas containment boom developed by Johns-Manville for the Office of Research and Development has been determined to be effective in seas of 2 to 4 feet and currents of up to 1 knot. One of the prototype boom systems will usually be available for a spill of opportunity after June 1972. Additional operational boom systems should be available in Summer 1973.
>
> "The statement is very thorough and well written. There are no engineering objections. The prime judgment factors relate to our national energy policy which I feel is beyond the scope of comment by this office."

From the review by the Coast Guard's Office of Merchant Marine Safety the following comment was made:

> "We have no pointed remarks. This seems like a fair assessment. The assumption is the oil will be transported from the wells to the beach via pipelines. Apparently this will not directly produce any new terminal facilities that we would be concerned with."

In its review, the Office of Pipeline Safety of the Department of Transportation recommended one small change:

> "Page 91 (6) ". . . establishes standards for pipeline construction."
>
> should read
>
> (6) ". . . establishes standards for pipeline construction, operation and maintenance."

The Department of Transportation has no objection to the proposed sale of 78 tracts of submerged offshore lands. We have no further comments to offer regarding the draft statement which we feel was exceedingly well written and detailed and which appears to be in complete accord with the requirements of NEPA, 1969. It is recommended that the final statement reflect the change as noted in the review by the Office of Pipeline Safety.

This Department appreciates the opportunity to review and comment on the draft statement for the proposed Outer Continental Shelf oil and gas general lease sale. We would like to receive two copies of the final environmental impact statement.

Sincerely,

W. M. BENKERT
Rear Admiral, U. S. Coast Guard
Chief, Office of Marine Environment
and Systems

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF EMERGENCY PREPAREDNESS
WASHINGTON, D.C. 20504

OFFICE OF THE DIRECTOR

June 8, 1972

Honorable Rogers C. B. Morton
Secretary of the Interior
Washington, D. C. 20240

Dear Mr. Secretary:

Referring to my letter of May 25, 1972, (copy enclosed), I have consulted the Oil Policy Committee on the matter of the draft Environmental Statement for the Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Eastern Louisiana. The Committee is in agreement with the view in my letter and considers that increased development of domestic resources is essential from a national security point of view; increased imports clearly are not an acceptable alternative to increasing offshore production by this and other sales, which should be expedited.

The Committee also agrees with my conclusion that the issue is not one of either retaining or eliminating the Mandatory Oil Import Program as alternatives, since this program is a flexible one which can be adjusted to allow any level of imports deemed consistent with national security. The real issue, from a national security point of view, is whether a major expansion of imports is an acceptable alternative to the development of the oil and natural gas resources of the outer continental shelf. As stated in the paragraph above, we do not find this to be the case.

Sincerely,

G. A. Lincoln

G. A. Lincoln
Director

Enclosure

4/

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF EMERGENCY PREPAREDNESS
WASHINGTON, D. C. 20504

May 25, 1972

OFFICE OF THE DIREC

Honorable Rogers C. B. Morton
Secretary of the Interior
Washington, D. C. 20240

Dear Mr. Secretary:

This letter continues the frequent and continuous discussion and exchanges with you, your assistants, and among our staffs on the need to accelerate offshore leasing in order to improve our domestic energy base. I have reviewed generally the draft environmental statement on the proposed 1972 Outer Continental Shelf oil and gas general lease sale offshore Eastern Louisiana. This lease sale is one of the lease actions in the continuing development of our domestic base which we need to expedite for national security as well as other reasons.

I have noted that there can be some improved precision in the language in the draft, one example being the way we are now managing the Mandatory Oil Import Program in Districts I through IV (see enclosure), and I have asked that my staff continue their consultation with yours on detailed editing suggestions.

Sincerely,

G. A. Lincoln

G. A. Lincoln
Director

Enclosure

OFFICE OF EMERGENCY PREPAREDNESS
EXECUTIVE OFFICE OF THE PRESIDENT

CONGRESSIONAL & PUBLIC AFFAIRS

WINDER BUILDING - 604 17th St., N.W.
WASHINGTON, D.C. 20504 * TEL (202) 395-5678

FOR IMMEDIATE RELEASE
THURSDAY, MAY 11, 1972

STATEMENT BY G. A. LINCOLN
CHAIRMAN, OIL POLICY COMMITTEE

Proclamation No. 4133, which was signed today by President Nixon, increases the quota levels for oil imports in Districts I-IV for the year 1972. The permitted level of overseas imports for the year is increased by 200,000 barrels per day and that for imports from Canada is increased by 30,000 barrels per day. However, it should be noted that overseas allocations can be used to bring in Canadian oil above the level established for Canadian oil.

This is the fourth time since February of 1970 that import levels have been set above the domestic production criterion which applied theretofore. The latest revision was the result of a re-evaluation of the supply and demand balance for petroleum which clearly showed that under present conditions domestic production would not meet the anticipated demand throughout the year without additional imports.

The new levels apply only to crude and unfinished oils in furtherance of the continuing policy of maintaining refinery capacity in the United States.

Allocations of the additional oil to eligible importers will be made as soon as administratively practical.

- OEP -

THE CHAIRMAN OF THE
COUNCIL OF ECONOMIC ADVISERS
WASHINGTON

May 30, 1972

Dear Dr. Pecora:

Thank you for sending us a copy of your draft environmental statement for the proposed offshore Louisiana oil and gas lease sale.

The purely environmental aspect of your draft report lies outside the area of expertise of the Council of Economic Advisers. We would like, however, to make an economic point regarding offshore lease sales and the alternative energy sources available. From experience it appears that further sales in this area offer the best prospects for incremental supplies of relatively low-cost natural gas. As you know, there is a shortage of natural gas caused by increased demands for clean fuels and low price ceilings set by the Federal Power Commission. Alternative sources, such as imported liquefied natural gas and synthetic gas made from coal or oil, would cost the Nation far more. Thus, from an economic point of view the Nation would be better off if it were supplied with gas from the low-cost offshore sources.

Sincerely,

Herbert Stein

Herbert Stein

Dr. William Pecora
Undersecretary of the
Department of the Interior
Washington, D. C. 20240

United States Department of the Interior

GEOLOGICAL SURVEY
WASHINGTON, D.C. 20242

OFFICE OF THE DIRECTOR
DES 72/47

May 26, 1972

Memorandum

To: Director, Bureau of Land Management
Through: Assistant Secretary--Mineral Resources

From: Director, Geological Survey

Subject: Draft environmental statement -- Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Eastern Louisiana

The subject draft environmental statement was reviewed as requested in your memorandum of March 30.

Survey comments were provided through participation in conferences with the Task Force that prepared the draft environmental statement.

J. R. Balsley

Acting Director

State of Louisiana

WILD LIFE AND FISHERIES COMMISSION
400 ROYAL STREET
NEW ORLEANS 70130

CLARK M. HOFFPAUER
DIRECTOR

May 5, 1972

Branch of Marine Minerals (313)
Bureau of Land Management
United States Department of the Interior
Washington, D. C. 20240

Attention: Mr. Donald Truesdell

Gentlemen:

Our technical staff has reviewed the draft environmental statement concerning the proposed 1972 Outer Continental Shelf oil and gas general lease sale offshore Eastern Louisiana. The report has been examined in some detail and we find that in general it presents a factual picture of the environmental impact of offshore oil operations and coincides closely with the findings developed by the State of Louisiana over the past twenty-five years.

That section dealing with alternatives was examined with some interest; however, we do not feel that we have the professional capacity of making constructive criticisms about most of the alternate proposals. Generally speaking, oil production or other types of fuel production away from the coastal area would be more satisfactory to Louisiana, if it were feasible, from the standpoint of protecting the important renewable fishery resources. Production in other areas, however, would be detrimental to Louisiana from an economic standpoint, and we feel that so long as production can be carried out under careful surveillance and regulations without interfering with our fishery potential, Louisiana would benefit from oil production on the coast.

Several comments may be in order concerning the details of the report:

1.) There appears to be no mention in the entire report of underwater stubs associated with nonproducing completions and their effect on trawling opertions. In recent years, these underwater completions have caused considerable damage to the fishery and an agreement was reached changing the Federal regulations requiring the necessity of such stubs. Since that agreement occurred, some stubs have been removed; however, there are 100 or more still in existence and we think it would be advisable to include in the impact statement mention of this problem with some recommendation as to having them removed below the mudline so that the sea floor will be returned to a normal condition.

2.) In recent months, it has come to our attention that offshore pipelines associated with oil and gas production when constructed in water depths of more than 200 feet cannot be satisfactorily buried beneath the substrate. If this is a fact, then careful consideration should be made either to develop engineering procedures for burying such pipelines or to design construction of pipelines on the sea floor that would not interfere with trawling. Exposed lines could be a serious problem and we understand at this time that some segments of the fishery industry have already filed complaints with the Permit Section of the Corps of Engineers about this matter.

3.) And finally, any increase in oil operations will, of course, increase the fact of chronic oil pollution and the dumping of trash and material from manned offshore platforms. In most instances this is a housekeeping problem and the result of human error and carelessness rather than accident. It might be advisable to consider placing one pollution enforcement officer on each manned platform on a fulltime basis to supervise all work activities which might result in chronic pollution and to check fail-safe devices on each platform on a regular schedule. This suggestion might at first seem unusual, but the Louisiana Wild Life and Fisheries Commission has maintained inspectors on each seismic boat operating in the Gulf for a number of years. These individuals are hired and supervised by the State of Louisiana but their

salaries and subsistence are paid by the oil and seismic companies involved. A similar system might be developed in order to supervise operations of manned offshore platforms.

In final analysis, the Louisiana Wild Life and Fisheries Commission agrees with the contents of the draft environmental statement and the above suggestions are offered in order to strengthen the statement and to fill certain loopholes which may exist in the general regulatory procedures.

Sincerely yours,

Clark M. Hoffpauer
Director

CMH:jf

State of Louisiana

J. M. MENEFEE
COMMISSIONER

DEPARTMENT OF CONSERVATION
BATON ROUGE 70804

P. O. BOX 44275

April 20, 1972

Mr. Donald Truesdell
Department of the Interior
Bureau of Land Management
Branch of Marine Minerals (313)
Washington, D. C. 20240

Re: Draft Environmental Statement

Dear Mr. Truesdell:

I welcome the opportunity to comment on the latest Draft Environmental Statement. The situation regarding Louisiana's ability to supply additional oil to satisfy increasing energy needs is still almost nil as fully explained in my letter to Mr. Dale R. Andrus of March 1, 1972, and as fully discussed with your Washington representative and Mr. John Rankin, Manager of the New Orleans OCS Office, at a meeting with them on March 7, 1972. I am attaching a copy of that letter for your ready reference.

The energy crisis, to which so many informed citizens have been alluding, is no longer a prospect of the future, but a reality. I believe the improvements in technology and the stricter enforcement of safety rules and regulations have eliminated the pollution of the environment to a practical minimum. The alternatives to the lease sale are in my opinion only alternatives in the distant future, but do not really apply to the immediate solution.

I can only reiterate what I have said on several occasions in the past which is all a matter of record with your department. The lease sale cannot be delayed if we are going to start solving the energy dilemma.

Yours very truly,

J. M. Menefee
Commissioner

TMW/lwh

Attachment

COPY

State of Louisiana

J. M. MENEFEE
COMMISSIONER

DEPARTMENT OF CONSERVATION
P. O. BOX 44275 – CAPITOL STATION
BATON ROUGE 70804

March 1, 1972

Mr. Dale R. Andrus
Acting Assistant Director
Bureau of Land Management
Washington, D. C.

Re: Draft Impact Statement
Offshore Eastern Louisiana
Sale

Dear Mr. Andrus:

I received your letter of February 22nd and I appreciate the invitation contained in it to comment on the Final Impact Statement for the Eastern Louisiana sale in connection with the preparation of a new Impact Statement on the same subject. This of course is a matter in which we all have a vital interest.

By way of background, I would like to record the fact that I am completing my eighth year as Louisiana Commissioner of Conservation and during virtually all of that period regulated the offshore area with which you are now concerned by tacit agreement with the United States. During that period, my staff and I concerned ourselves and devoted considerable time and attention to the regulatory and environmental problems with which you are now concerned. In addition, I have a rather close personal knowledge of actual offshore operations through many years of following my principal hobby, that of sports fishing in the waters off the coast of Louisiana. Finally, I attended the September 8, 1971 hearing on the Eastern Louisiana sale and heard all the evidence that was adduced at that hearing. My comments will be based on a combination of the information gained from all of these experiences.

My comments on the existing Final Impact Statement and on the Addendum to that Statement of January 15, 1972 are as follows:

(1) While the main thrust of my comments will be directed to the alternatives to the proposed sale, I feel impelled to record a rather firm impression concerning the general discussions in the Impact Statement concerning the favorable and unfavorable aspects of the sale. My staff and I find the Statement to be somewhat negative in its approach in that it seems to stress and highlight adverse environmental effects which at best are possibilities and not really supported by the history obtained from many years of prior operations in the Gulf. As an example, it lays great emphasis on potential and possible permanent adverse effects of another major spill, while ignoring some of the solid evidence presented at the hearing that none of the prior spills caused such damage. Also while it takes note of the new stringent safety regulations that have been adopted by the Geological Survey to minimize the possibility of future accidents and spills, it fails to record the evidence given at the hearing of the tremendous efforts and expenditures that have been made by industry to meet these requirements, thereby placing the offshore operators in the best position possible to avoid future accidents.

I am not criticizing the Statement for weighing both the favorable and unfavorable aspects of the proposed action. This of course should be done. I do feel, however, that the unfavorable points were given greater emphasis than the favorable ones. I also suggest that once the pros and cons are weighed, the Statement should reach on each subject a conclusion with respect to the justification or lack of justification for the sale.

(2) You specifically asked for my comments on the special stipulations to be imposed on leases for certain tracts. The control over the location of structures relating to Tracts 2247, 2248 and 2249 appears to be reasonable. The second one relating to Tracts 2272, et al and involving oil containment procedures also appears to be appropriate, although I would recommend that the Regional Supervisor be given more discretionary authority than is contained in the stipulation incorporated in the prior notice of sale. I refer particularly to his restricted authority to waive the 12-hour requirement for having containment equipment in use at the site to weather and attendant safety of personnel. There may be several other conditions that would justify the granting of a reasonable delay.

(3) In connection with the alternatives to the proposed sale, I would first like to address myself to the proposal for the modifications of the oil import quota system as discussed in the Addendum. Speaking both as a State regulatory official and as a concerned citizen, I reject completely as invalid the position of those who would

remove entirely the import restrictions and rely on these imports at the expense of domestic production to satisfy our energy needs.

According to published reports of a recent statement from Secretary Gene P. Morrell, Director of the Office of Oil and Gas in Interior, 23 per cent of the U.S. petroleum supplies in 1970 came from foreign sources. His projection was that the dependence on imports would rise to 45 per cent by 1985. Some private forecasts fix the 1985 figure at 53 per cent. I find all of these figures to be rather frightening, both from the standpoint of national security and our national economy. As was noted in the Addendum, most of the additional imports would probably come from the Eastern Hemisphere; and in my opinion, an increasing reliance on such unstable sources could well bring us overnight to a condition such as England faces today.

It is of course obvious that our current energy crunch is such that imports will have to be increased. Nevertheless, it is my firm belief that this increase should be held to a minimum and that the public interest requires that this dependence on additional imports be minimized to the maximum extent possible by fostering and encouraging the expansion of our now ailing onshore industry and by proceeding at an accelerated rate to lease and develop the valuable deposits on the outer continental shelves of the Lower 48 States and the Gulf of Alaska.

(4) The second proposed alternative considered in the Addendum was the elimination of market-demand proration by the three producing states (Texas, Louisiana and New Mexico) which have previously employed that system of proration. From personal experience as Louisiana Commissioner of Conservation, I brand this suggestion as a complete myth and as one which would do nothing to alleviate the current energy crisis. I offer the following historical background and a report on the present status of the Louisiana situation as irrefutable proof of my statement:

The Louisiana Department of Conservation has in recent years carefully watched the growing energy crisis and has tailored its regulatory actions to allow Louisiana to play its part in meeting that crisis. In addition, the Louisiana Legislature, in its 1970 Session, adopted a resolution which directed the Department of Conservation to initiate a study of the crude oil depth bracket allowable in the State for the purpose of formulating a new depth bracket schedule. The primary purpose of the proposed revised schedule was to increase allowables in the deeper depth ranges and thereby encourage deeper exploratory drilling.

This study was made and a new depth bracket formula was approved and made effective by the Department as of July 1, 1971. It substantially increased the allowables in the deeper depth brackets.

In a further effort to satisfy the market demand and to further alleviate the national energy crisis, Louisiana through the Department of Conservation has increased its allowables since January, 1969 from 40 per cent to a current allowable of 75 per cent. Because of the lack of drilling activity in the State, which would add to the amount of oil that we could produce, we are each month losing position and are able to produce less oil at a fixed allowable rate than the previous months. As an illustration, in January, 1971, producing at a 75 per cent allowable rate, we produced 1,907,984 barrels per day. The current situation is outlined as follows:

On February 11, 1972 the Department of Conservation held a statewide allowable hearing in New Orleans, Louisiana. At that hearing, I issued the following statement:

> "On January 7, 1972, at the last Statewide hearing here in New Orleans, I announced that any depth bracket increase above 75% in the future would be dependent upon the then reserve producing capacity of the State. Seventy-five percent (75%) allowable for February is producing an estimated 1,776,123 barrels of oil per day, or approximately 51,000 barrels per day less than the market demand indicated by the purchasing companies. The current nominations as filed by the purchasers now indicate a market demand of 1,884,970 barrels per day, or 61,829 barrels per day in excess of February nominations. March's expected production at 75% to satisfy this current market demand would fall short by 123,847 barrels per day. To satisfy the March market demand as evidenced by the nominations would require approximately an 18% increase in depth bracket, or bring the depth bracket to approximately 93% of the July, 1971 revised depth bracket allowable. Now, if this were related to the old pre-July, 1971 depth bracket, we would have to produce at a figure of 105% of the old depth bracket formula.
>
> "All of the above information points to the fact that we have reached a point in time when we are no longer able to satisfy the market demand as evidenced by your

nominations and we are in a position worse than we were 30 days ago to accommodate your requests. In recognition of our problem and to satisfy as much of the market demand as possible without injury to reservoirs in the State or without the creation of waste by allowing production at rates which would result, or tend to result, in reducing a quantity of oil or gas ultimately recoverable from reservoirs within the State, we have had a meeting on yesterday with representatives of the five major producing companies of the State. We have called this matter to their attention and have, in effect, indicated to them that we will consider the current allowable based on 75% depth bracket as maximum allowable unless and until evidence is presented to the Commissioner which would conclusively indicate that certain reservoirs and wells located therein could efficiently produce at higher rates. We have cautioned them that this information should be well documented and that if such information were used to justify the increase sought for and the experience did not bear out their contentions, that the exceptional allowable granted would, therefore, be withdrawn.

"For all practical purposes, it is our feeling that the current depth bracket of 75% represents a ceiling until such time as positive and compelling evidence indicates justification for higher allowables, and in those instances such allowables should only be for reservoirs and wells capable of efficiently producing same.

"For the above reasons, we will continue the allowables for March at the current 75% depth bracket."

The results of our continued efforts to explore this problem since the February 11th hearing have been shocking. In lieu of the prediction made at the hearing that March's expected production would fall short by 123,847 barrels per day, it now appears that this shortage will be 170,000 barrels per day. Also, we have completed our conferences with the five major producing companies of the State which account for most of our production. We invited them to point out to us specific reservoirs that could be efficiently produced at higher rates than the 75% allowable figure. These conferences produced definite

information that such reservoirs simply do not exist to any appreciable degree. Probably to the extent of from 50 to 75 thousand additional barrels at unrestricted rates.

The Addendum to the Impact Statement made the prediction that market demand proration will cease to function in fact by 1974 or 1975 without any governmental action. In view of the evidence I have now accumulated as Commissioner, I can assert to you firmly that this point has now been reached in Louisiana and will continue indefinitely. It is my understanding also that Texas, the other major oil-producing state, is in virtually the same position.

From the foregoing, I feel fully justified in branding the alleged alternative of abandoning market demand proration as a complete myth when it is to be considered as an alternative to the proposed leasing action.

(5) The third alleged alternative considered in the Addendum would be to increase onshore leasing and production. I strongly urge that this approach be taken, but I do not consider it to be an alternative at all to the proposed offshore leasing action.

I do not consider it appropriate for me to comment on the policy decision involved in opening to production the Naval Petroleum Reserves, although certainly this additional production is badly needed. I do feel that the requested trans-Alaska pipeline permit should be issued at the earliest possible date so that the North Slope production can be utilized. Finally, I feel quite strongly that onshore private exploration should be encouraged by permitting a general rise in the price of crude oil which I consider to be depressed as compared with other products except natural gas. While such a price rise would obviously be eventually borne by the consumer, it offers a practical means of halting the declining rate of exploratory effort and encouraging deeper drilling for onshore reserves that are badly needed.

(6) The fourth alternative discussed in the Addendum relates to the modification of natural gas pricing policies by the Federal Power Commission. I hold strong views on this subject. But again I do not consider that it is an alternative to the proposed lease sale.

There can be no doubt but that the major culprit in our present condition of rapidly declining exploratory efforts is the depressed artificial price structure that has been imposed on industry by the

Federal Power Commission through the years. In my opinion also the recent actions of the FPC in adjusting these prices upward simply are not realistic in arriving at the true market value of this vital natural resource. The greatest possible boon that could be given to the industry and to the consuming public would be to remove the FPC restrictions entirely and let the price of gas seek its natural level. The renewed interest in deeper exploratory drilling not only would result in substantially increased reserves of gas, but it should also increase oil production substantially. Again, the resulting cost increase to the consumer would more than be overcome by the insurance to them of a reliable and steady domestic supply of natural gas.

The imminent shortage of natural gas is known to everyone. However, I have just received dramatic evidence of the scope of this future shortage in the Federal Power Commission Staff Report No. 2 entitled "Natural Gas Supply and Demand, 1971-1990." It predicts deficits of about 9 trillion cubic feet by 1980 and 17 trillion by 1990. These figures coincide with our own thinking.

(7) The final alternative that was discussed is the increase in nuclear energy development. I agree with the conclusion in the Addendum that there are many unfavorable aspects to this approach and while I believe that efforts to develop nuclear energy should continue, I do not consider it as a realistic alternative to the proposed leasing action, particularly for our short-term needs.

Again, I express my appreciation for the invitation to express my views on these important subjects.

Yours very truly,

J. M. Menefee
Commissioner

JMM/lwh

EION SMITH
GOVERNOR

EXECUTIVE DEPARTMENT
DIVISION OF PLANNING COORDINATION
BOX 12428, CAPITOL STATION
AUSTIN, TEXAS 78711
PHONE 512 475-2427

ED GRISHAM
DIRECTOR

May 23, 1972

Mr. George C. Turcott
Acting Director
Bureau of Land Management
U. S. Department of the Interior
Washington, D. C. 20240

Dear Mr. Turcott:

The Office of the Governor, Division of Planning Coordination (the State Planning and Development Clearinghouse), and affected Texas State agencies have reviewed the draft environmental statement for the 1972 Outer Continental Shelf Oil and Gas General Lease Sale, Offshore, Eastern Louisiana.

No major adverse remarks were made on the draft. However, the Texas Parks and Wildlife Department and the Texas Water Quality Board suggested several items for your consideration in developing the final environmental statement. The comments of these agencies are enclosed.

Thank you for the opportunity to review this draft environmental statement.

Sincerely,

Ed Grisham
Director

EG:jab

Encl. (2)

TEXAS
PARKS AND WILDLIFE DEPARTMENT

COMMISSIONERS

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CHAIRMAN, WELLS

MAX L. THOMAS
VICE-CHAIRMAN, DALLAS

HARRY JERSIG
SAN ANTONIO

JAMES U. CROSS
EXECUTIVE DIRECTOR

JOHN H. REAGAN BUILDING
AUSTIN, TEXAS 78701

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AUSTIN

BOB BURLESON
TEMPLE

JOE K. FULTON
LUBBOCK

May 16, 1972

Mr. Ed Coker
Division of Planning Coordination
Executive Department
Capitol Station
Austin, Texas 78711

Dear Mr. Coker:

We have reviewed the draft environmental impact statement on the 1972 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Eastern Louisiana. We find this statement adequate in some respects; however, the Texas Coast is not evaluated in any section with regard to possible spills which, if they occurred in summer, would likely move in this direction.

We also find that the fact of the effect of brine as a by-product which must be disposed of, is not discussed adequately.

If you concur in these comments, please forward to the Department of Interior.

Sincerely,

JAMES U. CROSS
Executive Director

RECEIVED
MAY 17 1972
Div. of Plan. Coord.

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BYRON TUNNELL

HUGH C. YANTIS, JR
EXECUTIVE DIRECTOR

PH 475-2651
A.C. 512

314 WEST 11TH STREET 78701
P.O. BOX 13246 CAPITOL STATION 78711
AUSTIN, TEXAS

May 2, 1972

RE: Draft Environmental Statement,
1972 Outer Continental Shelf
Oil and Gas General Lease Sale
Offshore Eastern Louisiana

Mr. Ed Grisham, Director
Governor's Office
Division of Planning Coordination
P. O. Box 12428, Capitol Station
Austin, Texas 78711

Dear Mr. Grisham:

In response to your memorandum dated April 11, 1972, a review has been made of the subject statement.

Substantial evidence exists to support the conclusion that the nation's basic energy resources must be expanded to avoid shortages, particularly shortages of liquid petroleum and natural gas. Some of the most promising areas for exploration are those proposed for leasing in the Gulf of Mexico. Alternatives to the proposed sale of leases suggested in the report include:

1. An offering of only those tracts determined to have a low potential for environmental risks.

2. Withdraw the sale, relying on increased imports of petroleum products; increased onshore production of oil and gas; stepped-up production of fossil-fueled, nuclear and hydro power; oil shale production; and/or modification of market-demand prorationing systems.

3. Delay the sale until new technology is available to provide increased environmental protection.

RECEIVED
MAY 5 1972
Div. of Plan. Coord.

Sale of leases and consequent drilling and production of oil and gas pose certain known risks. These include hazards to ecological systems including sport and commercial fishery resources from possible major oil spills. The report considers this risk as a low order of probability, stating that in the last 25 years, only 4 significant oil spills have occurred in more than 1,000 leases involving 9,000 drilled holes and 1,800 producing platforms. The report cites existing regulations, monitoring and inspection procedures as factors contributing to minimal risks of major oil spills.

Other unavoidable adverse effects may result from construction of oil and gas pipelines on the ocean floor and in coastal marshlands; potential interference of drilling platforms and production structures with commercial fishing operations; oil pollution effects on recreation resources; and the potential interference of drilling and production facilities with commercial shipping, particularly in and out of the Port of New Orleans. In the latter situation, "fairways" have been established to permit safe passage of vessel traffic and anchorage areas designated.

In all, safety regulations and operating procedures should hold risks to acceptable levels and permit controlled development of offshore petroleum reserves. Assessment of the several alternatives would seem to dictate continuation of plans for the sale of leases, perhaps giving consideration of some selectivity as suggested in alternative number 1 above.

Due to the location of the leases offshore from eastern Louisiana, the environmental impact of any possible incident on Texas coastal areas would appear minimal.

Very truly yours,

Robert G. Fleming, P.E., Director
Central Operations

WCJ:ww

cc: Mr. Bob Armstrong, General Land Office

STATE OF MISSISSIPPI
EXECUTIVE CHAMBER
JACKSON

May 31, 1972

WILLIAM LOWE WALLER
GOVERNOR

Mr. Donald Truesdell
Department of the Interior
Bureau of Land Management
Branch of Marine Minerals (313)
Washington, D. C. 20240

Re: Environmental Statement, Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale

Dear Mr. Truesdell:

In compliance with applicable regulations, the above referenced Bureau of Land Management Environmental Statement has been reviewed by appropriate State agencies concerned with various aspects of the Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale. Comments from individual agencies, along with a summary statement prepared by the Board of Water Commissioners, are enclosed herewith.

We feel that the 1972 statement satisfactorily meets the requirements of existing national legislation (NEPA 1969) and adequately reflects the nature of the project proposals.

Proposals of this magnitude are of considerable importance to the State of Mississippi, and we are committed to the protection and prudent management of all lands within, partially within, or in the immediate proximity of our offshore waters. We appreciate the opportunity to review the 1972 Environmental Statement, and I trust that you will allow more extensive participation by our State Agencies in actual project planning as the proposed offshore activities commence.

Yours very truly,

Bill Waller

BILL WALLER
GOVERNOR

S T A T E C L E A R I N G H O U S E F O R F E D E R A L P R O G R A M S

Federal-State Programs
Office of the Governor
510 Lamar Life Bldg.
Jackson, Mississippi 39201
Telephone 354-7570

State Clearinghouse No.

72060202

Date: June 2, 1972

TO: Mr. Donald Truesdell
Department of the Interior
Bureau of Land Management
Branch of Marine Minerals (313)
Washington, D. C. 20240

PROJECT DESCRIPTION: Environmental Statement, Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale

(x) 1. The State Clearinghouse has received notification of intent to apply for Federal assistance as described above.

(--) 2. The State Clearinghouse has reviewed the application(s) for Federal assistance described above.

(--) 3. After proper notification, no State agency has expressed an interest in conferring with the applicant(s) or commenting on the proposed project.

(--) 4. The proposed project is ( ) consistent ( ) inconsistent with an applicable State Plan for Mississippi.

(x) 5. Although there is no applicable State Plan for Mississippi, the proposed project appears to be (x) consistent ( ) inconsistent with present State goals and policies.

COMMENTS: Comments of State agencies and summary letter of the Board of Water Commissioners are attached and made a part of the Clearinghouse comments on this project.

This notice constitutes FINAL STATE CLEARINGHOUSE REVIEW AND COMMENT. The requirements of U. S. Office of Management and Budget Circular No. A-95 have been met at the State level.

Harold T. White

Harold T. White
Coordinator of Federal State Programs

cc: Gulf Regional Planning Commission
Southern Miss. P & DD

State of Mississippi

BOARD OF WATER COMMISSIONERS
416 NORTH STATE STREET
JACKSON, MISSISSIPPI 39201
354-7236

May 31, 1972

Mr. Donald Truesdell
Department of the Interior
Bureau of Land Management
Branch of Marine Minerals (313)
Washington, D. C. 20240

In re: Environmental Statement, Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale

Dear Mr. Truesdell:

Having effected State Agency review of the above referenced Environmental Statement, we are transmitting herewith our official response. We have purposefully delayed our reply, hoping to receive comments from six agencies (indicated on the enclosed attachments), which have not submitted either verbal or written responses to date.

The consensus of State Agencies participating in this review is that those objections to various passages of the 1971 Environmental Statement have been satisfactorily reconciled in the revised 1972 document. Therefore, we consider the 1972 statement to be adequate in both form and substance for the project proposal.

Appropriate agencies of the State of Mississippi will continue to monitor proposed offshore drilling activities, and will reserve the option of submitting further formal comments or suggestions at any future time.

We apologize for this belated response to your request for State Agency review of this Environmental Statement; however, considering the



limited time provided for a thorough review, we were obliged to be somewhat lenient with those not responding by the appointed deadline.

Yours very truly,

MISSISSIPPI BOARD OF
WATER COMMISSIONERS

Jack W. Pepper,
Water Engineer

JWP:mm
Attachments

GULF REGIONAL PLANNING COMMISSION

SERVING PEARL RIVER, HANCOCK, HARRISON AND JACKSON COUNTIES OF MISSISSIPPI

POST OFFICE BOX 1346
GULFPORT, MISSISSIPPI 39501

TELEPHONE (601) 864-1167

April 24, 1972

Mr. J. I. Palmer, Jr.
Director of Resource Planning
State of Mississippi
Board of Water Commissioners
416 North State Street
Jackson, Mississippi 39201

Dear Mr. Palmer:

The "Draft Environmental Statement" for the Proposed 1972 Outer Continental Shelf (OCS) Oil and Gas General Lease Sale Offshore Eastern Louisiana, prepared by the Bureau of Land Management, Department of the Interior has been reviewed and found acceptable by this office.

We are pleased to state that environmental objections to the 1971 OCS lease sale proposal, as presented in our letter of August 25, 1971 (copy attached) concerning Main Pass Blocks Nos. 60, 61, 73, 146, 147, 148, 149, 150 and 151 have been removed in a very satisfactory manner. Blocks 73, 147, 148 and 151 have been completely removed from the lease sale proposal for 1972. Blocks 60, 61, 146, 149 and 150 have been made subject to Federal regulations prohibiting erection of structures in areas designated as ship fairways (see pages 48 and 73 of OCS draft statement).

We agree that more time should be provided for review of project plans and environmental statements.

This concludes the statements of this office. It has been our pleasure to be of service.

Sincerely,

Jack Different

Jack Different
Executive Director

JD/VJC/ eb

GR
PC

DEPARTMENT OF JUSTICE
Office of the Attorney General
JACKSON, MISSISSIPPI 39205

A. F. SUMMER
ATTORNEY GENERAL

R. HUGO NEWCOMB
ASSISTANT ATTORNEY GEN

May 8, 1972

Mr. J. I. Palmer, Jr.
Director of Resource Planning
State Board of Water Commissioners
416 North State Street
Jackson, Mississippi 39201

Subject: Environmental Statement, Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale

Ref: yr ltr 13 Apr '72

Dear Sir:

In answer to your request, this to advise you that we have no comments to make on the revision of the environmental statement prepared for the proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale.

Sincerely,

Hugo Newcomb

R. Hugo Newcomb, Sr.
Assistant Attorney General

RHNsr:cr

STATE OF MISSISSIPPI
DEPARTMENT OF ARCHIVES AND HISTORY
P. O. BOX 571
JACKSON, MISSISSIPPI 39205

MCLEMORE, PH.D., LIT.D.
DIRECTOR

May 8, 1972

Mr. J. I. Palmer, Jr.
Director of Resource Planning
Board of Water Commissioners
416 North State Street
Jackson, Mississippi 39201

Dear Jimmy:

In compliance with your request of April 13, I have reviewed with interest the Draft Environmental Statement that has been prepared by the U. S. Department of the Interior for the proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Eastern Louisiana.

From my review, it appears that the project would have no dominant adverse effect on historical or archaeological properties. I note that reference has been made to Fort Massachusetts, which is on the National Register of Historic Places, as well as a part of the Gulf Islands National Seashore. Although I am not sure of the distances involved, it appears that there will be no undesirable visual impairment or impact from rigs that would affect Fort Massachusetts. I hope that I am correct in this respect.

Thank you for allowing us this opportunity to comment.

Sincerely yours,

Elbert

Elbert Hilliard
Director
Division of Historic Sties and Archaeology

EH:mph

MISSISSIPPI
STATE BOARD OF HEALTH
JACKSON, MISSISSIPPI 39205

HUGH B COTTRELL, M.D., M.P.H.
STATE HEALTH OFFICER

May 4, 1972

Mr. J. I. Palmer, Jr.
Director of Resource Planning
Board of Water Commissioners
416 North State Street
Jackson, Mississippi 39201

Dear Mr. Palmer:

Re: Environmental Statement, Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale

This is to advise you that I have reviewed the draft of the Environmental Statement which you sent to us on April 13.

We do not have any comments at this time. We do appreciate your sending this to us for our review and file. If we can be of any service to you, please feel free to call on us.

Very truly yours,

Randal Embrey

Randal Embrey
Assistant Engineer

RE/mb

MISSISSIPPI GEOLOGICAL ECONOMIC
&
TOPOGRAPHICAL SURVEY

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WILLIAM H. MOORE, DIRECTOR & STATE GEOLOGIST

2525 N. WEST STREET
POST OFFICE BOX 4915
JACKSON, MISSISSIPPI 39216
(601) 354-6228

April 25, 1972

Mr. J. I. Palmer, Jr.
Director of Resource Planning
Board of Water Commissioners
416 North State Street
Jackson, Mississippi 39201

Dear Mr. Palmer:

We have no comments on the proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale.

Sincerely,

MISSISSIPPI GEOLOGICAL SURVEY

William H. Moore
Director and State Geologist

WHM:jk

COMMENTS OF ASSOCIATED GAS DISTRIBUTORS
ON THE DRAFT ENVIRONMENTAL STATEMENT MAY 15 1972
FOR THE PROPOSED
1972 OUTER CONTINENTAL SHELF
OIL AND GAS GENERAL LEASE SALE
OFFSHORE EASTERN LOUISIANA

I. General Position Statement

The Associated Gas Distributors (AGD)[1/] includes gas distributing companies which supply gas service to some 11,000,000 customers in Connecticut, Delaware, the District of Columbia, Georgia, New Hampshire, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Virginia and West Virginia. As public utilities with the legal obligation to maintain adequate gas distribution service, the AGD companies support the Interior Department's decision to conduct further lease sales. Our purpose in commenting on the draft environmental statement is to point out several areas in which that statement could be expanded in order to assure that the statement is as complete as possible so that there will be no further delays in offshore leasing activity.

II. Comments on the Draft Environmental Statement

The several alternatives to the proposed lease sale which should be more fully developed are these:

1/ AGD is an unincorporated group of public utility companies engaged in the distribution of natural gas. Its membership is listed on the attached sheet.

A. Alaska North Slope Oil and Gas

B. Imported LNG and Synthetic Gas

C. Importation of Gas from Canada

D. Reduction in Demand

E. Atlantic OCS Leasing

F. Increased Oil Imports

The following comments are intended to suggest ways in which the treatment of these alternatives could be made more comprehensive.

A. Alaska North Slope Oil and Gas

The Environmental Statement (Statement) as drafted points out that oil and gas from the proposed sale "would tend to serve" the Midwest and the East Coast and that North Slope oil, if delivered to the West Coast as proposed for the trans-Alaska pipeline route, would not serve either of those areas.[2/] It was therefore concluded that "North Slope Oil cannot be considered an alternative for production from the proposed OCS lease sale since 99 percent of the oil from the proposed sale would be consumed" outside the West Coast.[3/] The only treatment of Alaskan gas is as follows:

> "Alaska gas would not be made available until a route is agreed upon for a gas pipeline and the construction is allowed to follow."[4/]

2/ Statement, p. 137.

3/ Ibid., p. 150.

4/ Ibid., p. 151.

Recognizing that various interpretations may be made of the definition of "alternatives to the proposed action" as required in Section 102 of the NEPA, it would seem reasonable to supplement this reference to Alaskan gas with a review of the several alternative routes proposed for gas and oil pipelines from Alaska. These alternative pipeline routes, unlike the Trans-Alaska pipeline, would bring oil and gas from the North Slope to the Midwest, one of the specific areas that would benefit from the proposed lease sale.

Duplicating the work presented in Volume 5 ("Alternatives to the Proposed Action") of the Final Environmental Impact Statement for the Proposed Trans-Alaska Pipeline would seem unnecessary; however, an index outlining the alternate routes and systems with page numbers referenced might be included. In addition, the Statement should be supplemented by a review of these three major proposals advanced by U.S. and Canadian companies to transport gas from the North Slope to midwestern U.S. markets:

1. The Gas Arctic Systems Proposal

Gas transported through this proposed system would be available to the following areas in the United States: Northwest, California and Midwest. It would arrive at the Northwest via Trans-Canada Pipeline Ltd.'s

facilities which transport gas to Eastern Canada. The Gas Arctic Systems Study Group has indicated that it would be possible to begin construction in 1973. Besides traversing the Northwest Territories, a potential advantage to this system is its utilization of the existing Alberta Gas Trunk System which could result in a "relatively low incremental cost for substantial additional capacity."[5/]

2. The Mountain Pacific Proposal

In this system, about one-half of the total Alaskan gas (with additional supplies coming from Fort Laird) would be delivered to the Canadian and Midwestern U.S. markets. A projected schedule indicates that in late 1975 initial operation could begin. The remaining half of the gas would be delivered to U.S. Pacific Coast markets.

3. The Northwest Study Group Proposal

This pipeline project would bring natural gas from the North Slope and Northern Canada to U.S. Midwest markets and to Eastern Canada. The tentative start-up date is generally regarded as 1976. A comprehensive

---

5/ For a detailed description of this and other proposals, see National Gas Supply and Demand 1971-1990, Federal Power Commission Staff Report No. 2, February 1972, pp. 97-108.

feasibility study is being conducted by this group with a budget of $12 million; work at the Arctic test facility will cost about $3.5 million.

Among other factors that should perhaps be mentioned in regard to these proposals are the following: (1) the Gas Arctic Systems Group is also engaged in an extensive research program to assess all aspects of construction and operation of an Arctic pipeline; (2) Minister Macdonald of Canada spoke of the advantages of a Midwest route over one to the West Coast which would threaten the ecological system there and that Canada is interested in developing both gas and oil pipelines simultaneously through the Mackenzie Valley corridor with the United States;[6/] (3) the Canadian government has been engaged in a program of environmental, scientific and technical investigations designed to develop a comprehensive understanding of the northern environmental and ecological balance since 1968 and announced general principles for assessing pipeline applications as early as 1970;[7/] (4) the difference in time frame between an early Alaskan oil line and a Canadian one has most

---

6/ Press Conference, Donald S. Macdonald, Canadian Minister of Energy, Mines and Resources, March 30, 1972.

7/ Letter from Minister Donald S. Macdonald to The Honorable Rogers C. B. Morton, March 28, 1972, p. 1.

recently been quoted as two years, and (5) various international agreements (between the U.S. and Canadian governments) would be required before applications could be approved by the several regulatory bodies having jurisdiction.[8/]

In view of the above and the current interest in the trans-Canada pipeline route,[9/] it would seem appropriate under Section 102(E) of NEPA to review the other alternatives suggested above whereby North Slope oil and gas could be delivered to the United States.

B. Imported LNG and Synthetic Gas

While the draft statement contains a thorough discussion of additional oil imports as an alternative to the proposed sale, no discussion of gas imports was included. Limited quantities of liquefied natural gas (LNG) are now being imported and various proposals have been made to the FPC seeking authority to expand imports of LNG and for the manufacture of natural gas from imported crude oil and/or naphtha (SNG processes). Since these proposals could affect the supply of natural gas in areas which would receive gas from the proposed lease sale, it would be appropriate to consider them in the Final Impact Statement.

8/ Macdonald, op.cit., p. 12.

9/ See, for example, statement by Senators Robert P. Griffin, et al., urging consideration of trans-Canada pipeline, May 2, 1972.

1. LNG

The following topics, among others, would seem to be appropriate areas for discussion and analysis of imported LNG as a possible alternative to gas from the proposed lease sale area.

a. In recent years, the technology of liquefying natural gas has been developed so that it is now feasible to liquefy gas, transport it in ocean-going cryogenic vessels and deliver the gas to receiving facilities where it is stored and regasified for delivery to the consumer through existing gas distribution facilities.

b. The facilities for the importation of LNG include cryogenic storage tanks, docking, receiving and regasification installations, and miscellaneous auxiliary equipment. In addition, it may be necessary to enlarge some shipping channels by dredging.

c. The possible adverse environmental impact of LNG importation results from the effects of additional dredging on the marine environment at the delivery site, the preemption of coastal lands necessary to provide a site for the facilities and from some increase in tanker traffic. LNG imports involve a significantly higher unit cost of natural gas than domestic sources.

d. Among the favorable environmental effects of LNG imports are the low level of pollution emitted when natural gas is consumed, the adaptability of this energy form to already-installed pipeline and distribution facilities and the fact that a large amount of energy can be handled at a single installation.

2. Imported Crude Oil and Naphtha Conversion Processes

The following points, among others, would be appropriate topics for analysis in connection with any discussion of imported crude oil and naphtha conversion processes as a possible alternative to natural gas from the proposed lease sale area.

a. The conversion of crude oil into SNG would involve the construction of new plants or the expansion of existing refineries. The process for converting crude oil to synthetic gas has not yet been developed as a commercially feasible operation. Improvements in this technology are anticipated, but the process is not expected to be available for commercial use for at least several years.

b. The conversion of naphtha to synthetic gas is now commercially feasible and several projects are now under construction.

c. Among the possible adverse environmental effects of this alternative would be the increased

tanker traffic necessary to supply the additional crude oil or naphtha imports, tanker oil spillage, the acquisition of unused land for plant sites and the higher unit cost of gas from this source.

d. The favorable environmental effects of this alternative would include the relatively low level of pollution emitted on the combustion of SNG and the availability of facilities for the distribution of SNG to the consumer.[10/]

In addition to the above alternate sources of natural gas or SNG, additional gas supplies are anticipated to become available from nuclear stimulation of natural gas reservoirs, the conversion of oil shale, tar sands and coal, and the pyrolysis of refuse. These alternatives have been fully analyzed in Volume 5 of the Final Environmental Impact Statement on the proposed trans-Alaska pipeline. While none of these sources of gas appears to offer methods of supplying gas as soon as it might be available from the lease sale acreage, they should nonetheless be discussed in the Final Impact Statement in order to provide interested parties with adequate information and notice as to both short-range and long-range alternatives. To this end, it is desirable to include this additional discussion

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10/ For a helpful discussion of LNG and synthetic gas supplies, see FPC Staff Report on National Gas Supply and Demand, 1971-1990, pp. 59-72, 108-112.

as a part of the Final Impact Statement on this lease sale rather than by citation to the Trans-Alaska Pipeline Impact Statement.

C. Importation of Gas from Canada

In addition to the possibility of additional LNG and SNG imports, U.S. natural gas supplies may be augmented by further imports from Canada. Whether and when this source of supply could provide a feasible alternative to the supply of gas from the tracts proposed for leasing is a matter of conjecture at this time.

The Canadian National Energy Board announced in November 1971 that there was "no surplus of natural gas remaining" after allowance for Canadian requirements and that, accordingly, it was unable to approve additional exports of gas to the U.S. Developments since that time include the discovery of gas on Sable Island, off Nova Scotia and additional discoveries in the Mackenzie Delta and Arctic Islands areas. The FPC Staff's analysis of these discoveries concludes that they form the basis for a future, exportable gas surplus and that the level of Canadian imports to the U.S. will therefore increase in the future.[11/] The NEB, however, has not made any announcement in this regard.

11/ See National Gas Supply and Demand, 1971-1990, Staff Report No. 2, pp. 54-57.

If additional gas imports become available from Canada in the near future, such imports could reduce the demand for offshore Louisiana gas insofar as the Midwest U.S. markets are concerned. However, in view of the level of gas supply curtailments experienced by east coast markets (see Section D, infra), the volume of gas supply estimated from the proposed leasing area would still be required in order to meet unfulfilled, authorized demand.

D. Reduction in Demand

In discussing the reduction of energy demand as an alternative to the proposed sale it is appropriate to distinguish between the oil and gas to be obtained as a result of the lease sale. Specifically, these points should be made in evaluating the reduction in demand for natural gas an an alternative:

1. The demand for natural gas is already under restraints as a result of a variety of controls, including regulatory limitations on new sales (including sales in the residential and commercial categories), voluntary restrictions on new sales adopted by gas distribution companies and the economic restraints inherent in rising retail rates for natural gas.

2. The increment of natural gas supplies resulting from the proposed lease sale would not cause any growth or change in the current pattern of gas consumption. Several pipelines supplied from the offshore Louisiana areas are

presently curtailing deliveries below their certificated contract quantities and the additional volumes made available from the acreage to be leased would only partially offset these curtailments. For example, the largest of the Southern Louisia pipeline purchasers, United Gas Pipe Line Company, has projecte a total daily curtailment of sales for each of the months April through October 1972 of 1,034,000 Mcf. Of this total, more tha 460,000 Mcf per day is attributable to United's pipeline custom ers which sell gas under 20-year commitments to distribution companies in the east and midwest. Thus, even if United were able to acquire 100% of the gas estimated to be available from this sale (200-400,000 Mcfd), it would not be able to meet its authorized contract quantities. United's own estimate is that it will be "difficult indeed to add new reserves fast enough to compensate for the alarming drop in deliverability of connected reserves." See United Gas Pipe Line Co., FPC Docket No. RP71-2 et al., February 14, 1972, Estimate of Supply and Demand.

3. The FPC has announced that it intends to conduct a "reappraisal of the question of cost classification and allocation in the light of the present increasing needs for gas and the current shortage as well as an overall review of rate desig Its purpose is to produce a "strong economic pressure" which could conserve gas for residential, commercial and other uses

and to discourage the use of gas for large-volume industrial and boiler fuel purposes.[12/]

A determination of the environmental impact of this or any other program to eliminate any particular use of natural gas would depend on an analysis of the type and quantity of alternate fuel, if any, used as a substitute, the environmental factors prevailing at a particular location, etc. In general terms, natural gas combustion releases fewer pollutants into the air than any other fossil fuel. Therefore, the environmental impact would be one of the relevant facts to be considered in developing any such program. Nonetheless, in view of the currently unsatisfied demand for gas in the residential and commercial markets, this type of program would not remove the long-term need for the gas supplies available from the proposed leasing area.

E. Atlantic OCS Leasing

There was no mention of this alternative in the Statement. There is, however, good reason to believe that hydrocarbons in commercial quantities exist in the Atlantic Coast offshore area. It follows that the development of oil and gas from the Atlantic Coast should be mentioned as an alternative, albeit speculative, to the proposed sale. In reviewing such alternative, these points seem relevant:

12/ El Paso Natural Gas Co., FPC Opinion No. 600-A, May 8, 1972.

1. The three specific areas "showing the greatest possibilities for further research include the Baltimore Canyon Trough, seaward of the States from New Jersey to North Carolina; the outer edges of Georges Bank, south and east of New England, and the Blake Plateau Trough, off the States of Georgia and Florida."[13/] There has been no drilling on the Atlantic Shelf to date; any estimates of hydrocarbon reserves in this area should therefore be regarded as speculative and not comparable to the reserve estimates applicable to the tracts proposed for leasing in this sale.

2. Because of the Atlantic's sloping shelf and the location of possibly productive geologic formations in this area, rigs and platforms would be placed far offshore, eliminating the aesthetic effects and diminishing the possible environmental damage caused by exploration and production close to shore.[14/]

3. The environmental analysis of oil and gas exploration on the Atlantic Shelf has not been completed as of this time. Among the possible advantages of Atlantic Shelf oil and gas production would be the probable displacement in tanker traffic

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13/ Statement of Secretary Rogers C. B. Morton before the House Ways and Means Committee, December 8, 1971, p. 4.

14/ "These areas lie at least 30 miles and as far as 200 miles from the nearest point of land in the United States. Therefore, the possibility that oil wells might exist just off the beaches...is completely without foundation in the light of our present geological and geophysical knowledge." Ibid.

made possible by obtaining oil and gas from this area and the consequent reduction in tanker oil spillage. Further, the transportation distance for oil and gas from this area would be substantially less than from other domestic sources. Among the possible environmental disadvantages of this alternative would be the effect on marine environment of pipeline construction, the possibility of oil spills and the construction of platforms in shipping lanes.

4. Significant legal obstacles must be cleared before Atlantic OCS exploration could take place;[15/] there is, however, the possibility of making interim arrangements for leasing between the Federal Government and the States involved.

F. Increased Oil Imports

The Statement contains an extensive and detailed discussion of the alternative of increased oil imports to supply the energy needs of the areas which would otherwise receive substantial new supplies of gas and oil as a result of the proposed lease sale. We believe, however, that the discussion of the environmental effects of this alternative should be supplemented as follows:

1. While the effects of increased tanker traffic are mentioned (pp. 120-130, Draft Statement), no comparison is made

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15/ See U.S. v. Maine, et al., U.S. Supreme Court No. 35.

between the relatively insignificant impact of projected oil spills from the subject acreage and the impact of projected spills from increased tanker traffic into New York harbor and other East Coast ports. This comparison would show the clear and substantial environmental advantage of developing OCS acreage over increased oil imports. The East Coast is particularly susceptible to tanker pollution, since nearly 75% of all tanker arrivals in the United States occur between Virginia and Maine (most of these in New York, New Jersey, and Connecticut). It is estimated that tanker ballasting, loading, unloading, and accidents account for approximately 4 million tons of hydrocarbon pollution annually in the ocean.[16/] To the extent that it would make more tanker traffic unnecessary, the proposed lease sale offers environmental advantages over importation of additional oil.

2. Increasing oil imports as an alternative to the lease sale would have other significant and detrimental effects on the East Coast environment. It is estimated that the proposed acreage will be productive of 200-400 Mcfd of natural gas, a significant portion of which should become available to East Coast markets. Since natural gas combustion emits a lower level of particulate and sulfur dioxide pollution than any other fossil fuel, its replacement by imported oil would adversely affect

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16/ Blumer, M. "Oil Pollution of the Sea," Oil on the Sea, David P. Hoult (ed.), Plenum, New York, 1969.

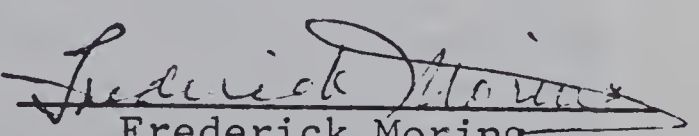
the level of air pollution, not only in the eastern metropolitan areas but throughout the east coast area.

III. Conclusion

For the foregoing reasons, Associated Gas Distributors urges the Department of the Interior to supplement its Draft Environmental Statement of March 31, 1972, insofar as the several indicated alternatives are concerned. We submit these suggestions to the end that the requirements of the National Environmental Policy Act can be met "to the fullest extent possible" and that further delays in OCS leasing can be avoided.

Respectfully submitted,

ASSOCIATED GAS DISTRIBUTORS

By 
Frederick Moring
Its Attorney

OF COUNSEL:

Morgan, Lewis & Bockius
1140 Connecticut Avenue, N.W.
Washington, D.C. 20036

May 15, 1972.

ASSOCIATED GAS DISTRIBUTORS

Atlanta Gas Light Company

The Berkshire Gas Company; Boston Gas Company; Bristol and Warren Gas Company; Brockton Taunton Gas Company; Buzzards Bay Gas Company; Commonwealth Gas Company; City of Holyoke, Massachusetts Gas and Electric Department; City of Westfield Gas and Electric Light Department; Concord Natural Gas Corporation; The Connecticut Gas Company; Connecticut Natural Gas Corporation; Fall River Gas Company; Fitchburg Gas and Electric Light Company; Gas Service, Inc.; The Greenwich Gas Company; The Hartford Electric Light Company; Haverhill Gas Company; Lawrence Gas Company; Lowell Gas Company; Lynn Gas Company; Manchester Gas Company; Mystic Valley Gas Company; New Bedford Gas and Edison Light Company; The Newport Gas Light Company; Northampton Gas Light Company; North Attleboro Gas Company; Northern Utilities, Inc.; North Shore Gas Company; The Pequot Gas Company; South County Gas Company; Southern Connecticut Gas Company, Springfield Gas Light Company; and Tiverton Gas Company (jointly)

The Brooklyn Union Gas Company

Central Hudson Gas and Electric Corporation

Consolidated Edison Company of New York, Inc.

Elizabethtown Gas Company

Long Island Lighting Company

New Jersey Natural Gas Company

New York State Electric & Gas Corporation

Philadelphia Electric Company

Philadelphia Gas Works, Division of UGI Corporation

Piedmont Natural Gas Company, Inc.

Public Service Company of North Carolina

Public Service Electric and Gas Company

Rochester Gas and Electric Corporation

UGI Corporation

Washington Gas Light Company

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MAY 22 '72
OFFICE OF THE DIRECTOR
BUREAU OF LAND MANAGEMENT

GAS TRANSMISSION CORPORATION

3800 Frederica Street
Owensboro, Kentucky 42301
Phone: 502/683-2431

May 11, 1972

Mr. Burt Silcock, Director
Bureau of Land Management
Department of the Interior
Washington, D. C. 20240

Dear Mr. Silcock:

At a recent meeting with your regional staff in the New Orleans office, Texas Gas acquired a copy of the Draft Environmental Statement 72-47 prepared for the proposed 1972 general lease sale for tracts in offshore Eastern Louisiana. We were asked to review the statement and make comments by May 15.

Our staff has reviewed the statement and finds that it is exceptionally diligent in its investigation of the impacts and alternatives to the proposed sale. The statement's conclusions on pages 101 and 102, to the effect that (1) few alternatives exist to help offset the need for domestic oil and gas during this period, and (2) additional potential energy sources are not considered to be reasonably available to meet short-run energy demand, appear to be realistic in view of the present energy-demand imbalance.

We have several specific comments to offer for your consideration. They are as follows:

I. Page 15, General Summary of Environmental Impacts which might Result from OCS Oil and Gas Operations

1. It appears to be questionable that platforms would have a negative impact on beaches, national parks, commercial fishing, recreation and shipping. Platforms may not be erected in shipping lanes. However, where erected, they have proved many times to be aids to safety and navigation.

2. Pipeline construction, though it does cause some temporary disruption to fishing, is not in itself a permanent impact. The pipeline is generally constructed, maintained, and protected in a manner that insures no permanent impact on fishing after construction is complete.

3. Platforms, pipeline construction, and storage facilities should have positive impacts on the regional economy due to the significant labor force and payroll involved.

II. Pages 90 and 93, References to Pipeline Corridors

Pipeline corridors will not guarantee that adverse impacts will be restricted to fewer locations. Since the impacts of pipeline construction are generally of a temporary nature, they will occur regardless of the corridor location. It is also quite conceivable that the corridor concept will actually introduce considerably greater risk of damage and environmental pollution than exists now. Construction methods offshore in open water are considerably different than onshore methods. On dry land it is possible to work within 25 to 50 feet of an active pipeline with almost no risk of damage; whereas, in offshore construction, separation of at least several thousand feet is necessary. It is a recognized practice in offshore construction to give wide berth to other pipelines and, where this is not possible, to interrupt operations until construction is complete. Although corridor entries to the shore may not involve the same risk as offshore corridors, there are other considerations to be made; i.e., (1) available land sites onshore for facility construction, and (2) availability to an existing onshore pipeline in an established right-of-way. In addition to the risks involved in construction, there are also risks involved during operation. With the corridor concept, it is possible for a catastrophe of any nature to cause damage not just to one pipeline, but to several parallel pipelines at one common location.

III. Pages 131 and 132, References to Proved and Potential Gas Reserves

The source of the reserve figures used in the last paragraph on page 131 and continued on page 132 is not identified. However, it appears that there may be several discrepancies. For instance, the reserve figure of 285.6 TCF indicated to be onshore is probably the total including offshore reserves. Later in the paragraph the designations for the 840 and 260 TCF

of reserves appear to be reversed. The Potential Gas Committee report issued in October, 1971, estimated potential reserves offshore of 238 TCF and onshore of 613 TCF for the 48 states. These estimates when added to the proved reserves would approximate 260 TCF offshore and 840 TCF onshore. If these are actually the source of the data, then it should be noted that these reserves are not necessarily "...resources producible with current economics and technology." The Potential Gas Committee report estimates that 307 TCF of this reserve for the 48 states is speculative. Speculative is defined as, "The most nebulous of new supplies is attributable to new field discoveries in formations or provinces not previously productive. This category represents the most difficult segment of the problem." However, of the remaining 544 TCF of probable and possible reserves, 130 TCF, nearly 25 percent, is estimated to be located in the areas offshore of the States of Louisiana and Texas, where immediate and future lease sales are planned. These are also the areas where there has been considerable geophysical and drilling activity and which are more readily available to existing offshore and onshore pipeline systems.

IV. Pages 208 through 214, Modification of Market-Demand Prorationing Systems

Referring to page 208, second paragraph, quote--

> "In practice, prorationing also serves to keep supply and demand at levels roughly sufficient to maintain prices at current levels."

This statement is difficult to understand and is certainly not applicable for gas prorationing since the price paid for gas is set by the gas purchase contract, approved by the Federal Power Commission, and is not a function of market demand or the volume of gas delivered from any gas well or gas field.

Referring to page 209, second paragraph, quote--

> "Projections by the Office of Oil and Gas, and industry, suggest that the increase in demand under current conditions will be such that prorationing will cease to function in fact by 1974 even without any State or Federal Government action. In that case, its elimination would not be an alternative for the period of interest to the proposed East Louisiana OCS lease sale since such production would begin subsequent to that time."

This could very well be true as to oil allowables; however, for this statement to be applicable to gas production, it is necessary to assume that each transmission company would need the maximum amount of gas possible from each gas well and/or field and have the pipeline capacity to purchase the maximum amount of gas from these wells and/or fields each day during the year regardless of the seasonal variations in markets and the capacity of their underground storage facilities.

So long as there are competitive reservoirs being produced and delivering gas to more than one pipeline company underlying lands and/or leases with more than one owner there will be a need to have regulatory bodies to establish fair and reasonable rates that will assure each party his share of the reserves and revenues regardless of the market demand or MER of a well.

Referring to page 210, first paragraph, quote--

> "Market-demand prorationing has already been eliminated on Federal OCS leasing by Presidential Order."

This order as it relates to the drafting of OCS Order No. 11, by the United States Department of the Interior, has caused much concern throughout the gas transmission industry. During the past year numerous meetings have been held by members of the United States Department of

Interior Staff, the Offshore Pipeline Committee, and the Offshore Operators Committee on the Drafting of OCS Order No. 11. The MER concept for gas well gas production and the protection of correlative rights (P. 82, 2nd Paragraph) have been discussed at great lengths in these meetings.

There are two additional comments which we would like to make that are not necessarily limited to the instant statement and sale, but which we feel are of the utmost urgency if this environmental statement is to become the pattern for future sales.

First, the statement does not stress the immediacy of the need for a short-term increase in conventional gas supply. Curtailment of gas supply is already a fact, and the situation will certainly become more critical within the next five to ten years unless there is some immediate relief. Second, we do not feel that the tentative five-year schedule of 10 sales at approximately 300,000 to 600,000 acres per sale is adequate to meet these short-term supply requirements. In our opinion, at least two million acres per year should be offered on a predictable schedule. Both of these points are developed in some detail in recent testimony on behalf of the American Gas Association and the Independent Natural Gas Association of America before the Senate Interior and Insular Affairs Committee in an Outer Continental Shelf Policy Hearing held on April 11, 1972.

We hope that these comments will be helpful to you in preparing your final statement.

Yours very truly,

William T. Turner, Jr.

William T. Turner, Jr.
Assistant to the Vice President

WTTjr:mmg

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TILFORD A. JONES
WILLIAM A. MOGEL

May 15, 1972

The Honorable Rogers C. B. Morton
Secretary of the Interior
Office of the Secretary
Department of the Interior
Washington, D. C. 20240

Re: Draft Environmental Statement
1972 OCS Lease Sale

Dear Mr. Secretary:

The enclosed comments on the Draft Environmental Statement with respect to the Proposed 1972 Outer Continental Shelf Oil and Gas Lease Sale, Eastern Louisiana is submitted on behalf of the United Distribution Companies which are:

AMERICAN NATURAL GAS SYSTEM
- Michigan Consolidated Gas Co.
- Wisconsin Gas Company

CENTRAL ILLINOIS PUBLIC SERVICE CO.

COLUMBIA GAS SYSTEM
- Columbia Gas of Kentucky, Inc.
- Columbia Gas of Maryland, Inc.
- Columbia Gas of New York, Inc.
- Columbia Gas of Ohio, Inc.
- Columbia Gas of Pennsylvania, Inc.
- Columbia Gas of Virginia, Inc.

CONSOLIDATED NATURAL GAS SYSTEM
- Consolidated Gas Supply Corp.
- The East Ohio Gas Company
- The Peoples Natural Gas Co.
- The River Gas Company
- West Ohio Gas Company

CONSUMERS POWER COMPANY

THE DAYTON POWER AND LIGHT CO.

EQUITABLE GAS COMPANY

ILLINOIS POWER COMPANY

INDIANA GAS COMPANY

MICHIGAN GAS UTILITIES CO.

Columbia Gas of
W. Virginia, Inc.
Ohio Valley
Gas Company

NIAGARA MOHAWK POWER CORP.

NORTHERN ILLINOIS GAS CO.

ORANGE & ROCKLAND
UTILITIES, INC.

NATIONAL FUEL GAS SYSTEM
Iroquois Gas Corporation
Pennsylvania Gas Company
United Natural Gas Company

SOUTH CAROLINA ELECTRIC &
GAS COMPANY

CITIZENS GAS AND COKE
UTILITY

THE PEOPLES GAS SYSTEM
North Shore Gas Company
The Peoples Gas Light &
Coke Co.

The above 32 gas distribution companies serve about 10.3 million metered customers, or a population of about 48 million people, and comprise 25% of the gas distribution operations throughout the United States. Because they were no longer able to obtain the gas supplies required by growing demands of the customers they serve, they formed a voluntary group for the purpose of participating in matters affecting their gas supply.

We have reviewed the Draft Environmental Statement and, while we do not recommend deletions of any material contained therein, we do recommend a few additional pages. We believe the Environmental Statement failed to reveal the very grim alternatives of the natural gas industry which will result if this lease sale is not made, or if it is even delayed.

These companies are faced with emergency conditions. Also, we believe it should be pointed out for the benefit of any reviewing court that from the edge of the Gulf where gas would be injected into existing pipelines, to the market place, the environment would not be disturbed in any way by production of additional volumes of gas offshore. The pipelines are installed and less than full.

We believe the Environmental Statement gives inadequate recognition to the fact that clean-burning natural gas will

result in a cleaner environment than any substitute fuel, even if substitute fuel were available which could do the job.

The enclosed comments also point out that many industrial processes cannot be maintained efficiently with alternate fuels. The reasons why this is true are set forth in the enclosed statement.

The United Distribution Companies appreciate the opportunity to submit these comments and hope they will be helpful.

Based on last year's experience, we must assume that the 1972 lease sale will be challenged in court. We respectfully request that Counsel for UDC be notified when any such litigation is commenced because we do want to intervene and participate in support of the Department of the Interior.

Very truly yours,

Tilford A. Jones

TAJ:cp

Enclosure

COMMENTS OF UNITED DISTRIBUTION COMPANIES WITH RESPECT TO UNITED STATES DEPARTMENT OF INTERIOR, DRAFT ENVIRONMENTAL STATEMENT, PROPOSED 1972 OUTER CONTINENTAL SHELF OIL AND GAS LEASE SALE, OFFSHORE EASTERN LOUISIANA.

The United Distribution Companies recommend that the following statements be added to the material contained in the Draft Environmental Statement at the places indicated.

I. Insert at the bottom of page 17:

Insofar as natural gas from OCS leases is concerned, the sale is of critical importance. Natural gas is the prime low sulphur anti-pollutant fuel as evidenced by a recent report of the Office of Air Programs of the Environmental Protection Agency.* Furthermore, a recent analysis by the staff of the Environmental Protection Agency shows a growing energy gap of environmentally suitable fuels in the Northeast, the area directly dependent on offshore Louisiana.** The offshore leases will be the potential

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* Compilation of Air Pollutant Emission Factors. Office of Air Programs of the Environmental Protection Agency, No. AP 42, issued February, 1972.

** Analysis of Energy-fuels Supply and Demand Situation in Selected Air Quality Control Regions of the Northeast Corridor. Prepared by the Fuel Policy Staff, Office of Program Development, Office of Air Programs, Environmental Protection Agency, May, 1971.

source of large new gas reserves vitally needed to meet these anti-polution problems in the northeastern part of the country.

II. Insert at the bottom of page 249:

D. For the Natural Gas Industry and Its Customers There is No Viable Alternative to the Sale of OCS Leases.

In considering alternatives to the sale of OCS leases in the Gulf of Mexico, great weight must be given to the environmental advantages of natural gas over other fuel and the damage which would result to American industry, consumers and the natural gas industry if there were any further delay in OCS lease sales.

The natural gas industry is the sixth largest industry in the United States in terms of investment. It has 900,000 miles of pipeline facilities and an investment of $46 billion.

1. Natural Gas Has Environmental Advantages Over Other Fuel.

The public record is replete with evidence of the contribution which natural gas can make in minimizing air pollution. More than a decade ago, the City of Los Angeles

required the use of natural gas, when available, to the exclusion of other fuels during periods of atmospheric inversion and smog accumulation. New York and Chicago are among the cities which have adopted pollution control rules best met by utilizing natural gas. Numerous state, city, and federal pronouncements extol the necessity for natural gas as an anti-pollutant.

In announcing national air standards last April, Environmental Protection Agency Administrator William D. Ruckelshaus said:

> "We estimate that to bring air pollution levels down to the standard for particulates in New York City will require a 300% increase in natural gas usage in the city. The only encouraging feature in the prognosis is that curing the particulate problem with natural gas will also take care of the sulfur oxides problem."

A recent report of the Office of Air Programs of the Environmental Protection Agency emphasizes that natural gas is the foremost fuel for use in combatting pollution.*

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* Compilation of Air Pollutant Emission Factors, Office of Air Programs of the Environmental Protection Agency, No. AP 42, issued February, 1972.

2. There Is a Present Natural Gas Shortage.

There is a grave present shortage of natural gas with which to meet the demands for this prime anti-pollutant fuel.* It has been judicially recognized.**

Ironically, the natural gas pipeline company which is the principal supplier of New York City had to reduce deliveries by seven percent due to its inability to secure gas in the producing area at almost the same time the Environmental Protection Agency Administrator was calling for a 300 percent increase in gas consumption in that city.

That company's experience is not unique. Expressed in terms of annual gas usage, our national inventory of proven reserves has fallen from 21 times annual usage in 1956 to approximately 11 times annual usage in 1971. This does not mean that we have an adequate supply for 11 years.

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* Analysis of Energy Fuels Supply and Demand Situation in Selected Air Quality Control Regions of the Northeast Corridor, prepared by the Fuel Policy Staff, Office of Program Development, Office of Air Programs, Environmental Protection Agency, May 1971.

** Louisiana Power & Light Co. v. United Gas Pipeline Co., No. 71-2550, 5th Cir. Jan. 14, 1972; Public Serv. Comm'n. of the State of N. Y. v. F.P.C., No. 71-1161, D. C. Cir., March 29, 1972.

As wells become older, their rate of productivity declines and it will take many years to produce the existing proved reserves. There is a present shortage in terms of deliverability. Today the natural gas industry cannot meet today's requirements.

This is borne out by the recent analysis of energy-fuels supply and demand situation of the staff of the Environmental Protection Agency issued in May 1971, cited above.

Furthermore, in February 1972, the Staff of the Federal Power Commission issued a report on National Gas Supply and Demand for the years 1971 through 1990. Page 3 of that report is attached hereto as Attachment G. The tabulation at the top of the page shows that in 1971 supplies fell about one trillion cubic feet short of meeting the demands, and that by 1980, taking into account the use of all substitute sources of natural gas, the deficiency will increase to 10 trillion cubic feet. The chart at the bottom of the page shows the increasing demand for gas on the top line and the bottom line shows the decline in production from the known reserves in 1970.

It is now an established fact that the interstate natural gas pipelines cannot meet their outstanding commitments. As a result, the Federal Power Commission has found it necessary to place into effect restrictions on the sale of natural gas to existing customers under existing authorizations. Final orders have been issued in three restriction cases*, and more than twenty-five additional cases are pending.**

3. Present Pipelines Can Move OCS Gas To Market.

The map of Major Natural Gas Pipelines, published by the Federal Power Commission, *** shows numerous pipelines emanating from the Gulf Coast and serving all market areas east of the Mississippi River. These pipelines represent investments of many billion dollars. They

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* United Gas Pipe Line Co., Docket No. RP71-29, et al, Opinion No. 606 issued October 5, 1971, Transcontinental Gas Pipe Line Corp., Docket No. RP71-118, Order issued November 15, 1971, Panhandle Eastern Pipe Line Co., Order issued November 4, 1971.

** Docket Nos. RP70-42, RP71-89, RP71-100, RP71-107, RP71-116, RP71-117, RP71-119, RP71-121, RP71-122, RP71-127, RP71-128, RP71-129, RP71-130, RP71-131, RP71-134, RP71-135, RP71-138, RP71-139, RP71-141, RP71-970, RP72-6, RP72-13, RP72-15, RP72-21, RP72-47, RP72-61, and RP72-64.

***Attachment H.

cannot be used for any purpose except to transport natural gas from the Gulf Coast area to markets. Since these pipelines are in place, there will be no affect upon the environment resulting from operating them at full capacity as distinguished from operation with substantial idle capacity.

Consequently, gas can be delivered to the markets without any environmental disturbance except from the well to the existing pipeline. In many cases, this connection can be made underwater in the offshore area. In some cases, it would be necessary to build new pipelines from the producing platform to the shore. The Federal Power Commission's pipeline map attached hereto as Attachment H shows that the Gulf Coast area is literally honeycombed with major pipelines, consequently no alternate source of fuel could be delivered to market with so little effect upon the environment.

If gas is to be obtained for the many pipelines emanating from the Gulf Coast Area, it must be obtained through the sale of OCS leases. If they are not sold, the economic impact upon manufacturing costs, consumer costs and householders would be very material, although

it is impossible to estimate.

4. Serious Industrial Problems Will Result If Natural Gas Is Not Found For Existing Users, And For Industrial Growth.

Natural gas has long been a prime non-polluting industrial fuel and curtailments in pipeline supply strike directly at existing usages and for essential growth in such usage. Serious economic disruptions and industrial disruptions also will occur if natural gas curtailments continue and increase. Such disruptions increase industrial costs, necessarily leading to upward pressure on industrial prices, and a worsening of the environment. For example:

(a) Conversion to a liquid fuel involves construction of facilities for storing an inventory of oil as well as related piping, pumps and heaters, even where liquid fuel can do the job, which is not always the case.

(b) The capacity of production equipment is sometimes reduced when fired by a fuel other than gas, e.g., the melt in a gas furnace must be reduced when a fuel more luminous than natural gas is burned, and similar difficulties may result if ammonia plants switch from methane to heavier feed stocks. This may result in up to 25% lost capacity.

(c) Breakage or spoilage increases in certain industrial processes where less desirable

fuels are substituted for natural gas. This problem occurs in refractory manufacture or metallurgical processes.

(d) Maintenance costs increase in certain industrial processes when gas is replaced by even a high grade liquid fuel. This is true, as one example, in the operation of turbines.

(e) In most cases, equipment will need to be modified and, in some cases totally replaced, in order to accommodate a different fuel. Complete replacement of direct flame makeup air heaters for a paint drying line could entail a new investment equal to 150% or more of the price of the replaced gas burning heaters.

(f) Natural gas provides approximately half of the petrochemical industry's supply of feed stocks and economic dislocations can be expected if it is no longer available.

(g) Natural gas is used as process fuel in many plants and its replacement would be most difficult from a technological point of view. For example, in ammonia reforming furnaces, temperature distributions within the furnace are critical so that the different flame characteristics produced by oil create operating problems. Also, the sulfur and ash content of the fuel must be very low in order to minimize tube corrosion in the presence of extremely high temperatures. It has been estimated that for a plant with a rated capacity of 1,000 tons of ammonia per stream day, or 340,000 tons per year, additional investment outlays of approximately $450,000 would be required to convert from natural gas to a liquid fuel.

(h) Natural gas has special qualities in the

metallurgical industry where exact temperature controls, low flame emissitivity, convective heat transfer and minimization of hot spots are important. Heat treating and annealing furnaces cannot easily be converted from natural gas to other fuels.

(i) In the manufacture of cement, natural gas has technical advantages not only because gas firing rates are easier to control, but also because cement must not contain excessive amounts of sulfur and sulfur is already present in the raw material before it enters the kilns.

Many other technical applications of natural gas are economically and technically superior to the use of any other fuel.

5. There Are Substantial Natural Gas Reserves Under The OCS.

The Mineral Resources Institute of Colorado School of Mines estimates that there remain to be discovered in the 48 contiguous states an additional 851 trillion cubic feet of natural gas. This is classified as 218 trillion cubic feet probable; 326 trillion cubic feet possible, and 307 trillion cubic feet speculative. The possible and speculative discoveries will depend upon improvements in technology. Of the 851 trillion cubic feet, 213 trillion cubic feet are estimated to exist under the outer continental shelf, and most of this is in the Gulf

of Mexico.

6. OCS Gas is Vitally Needed to Meet the Natural Gas Shortage and as Quickly as Possible.

Faced with the picture presented in the FPC Staff Study and in the Supply and Demand Study prepared by the Staff of the Environmental Protection Agency, both of which have been cited above, it is apparent that this nation needs all of the gas which can possibly be produced and just as quickly as possible. No alternative answers these fundamental problems.

If additional natural gas supplies were not made available from the OCS as quickly as possible, industrial production would be disrupted, plant capacities would be adversely affected, and in many cases unemployment would undoubtedly result. Such economic catastrophes would have a domino effect which would spread throughout the economy. In addition to the economic disasters, the environment would be adversely affected.

The natural gas industry is already unable to meet its contractual commitments and any delay in selling OCS leases will aggravate the problem. For this industry there is no viable alternative to a prompt lease sale.

Timing is of urgent importance because the industry is already unable to meet its contractual commitments, and there will be a substantial time lag between a lease sale and the availability of gas from the leases. Gas from Alaska and from coal are both years away and serious environmental and technical problems related to both are still under study.

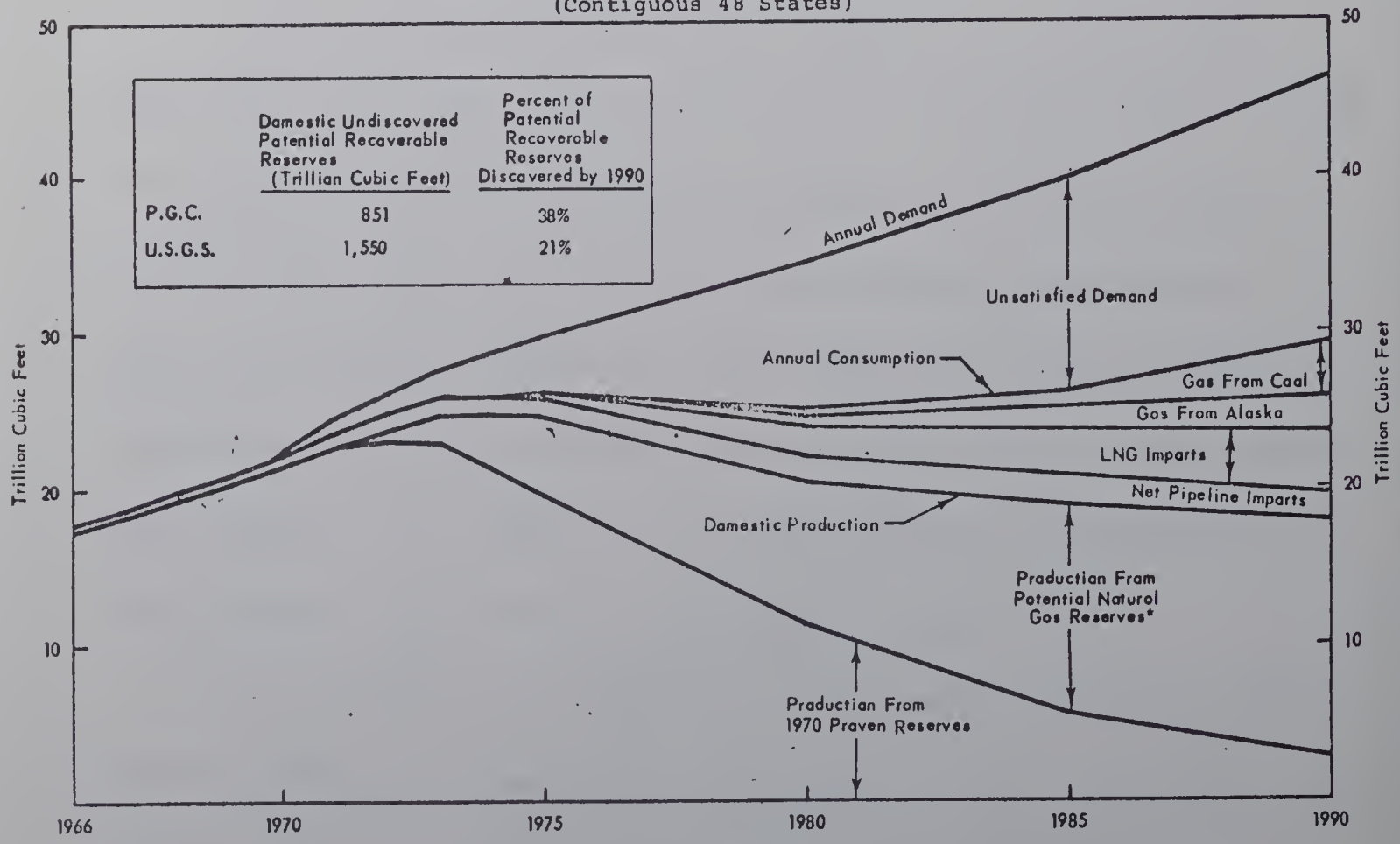
Table 1
UNITED STATES GAS SUPPLY-DEMAND BALANCE
Actual 1966-1970; Projected 1971-1990
(All Volumes in Trillions of Cubic Feet @ 14.73 Psia and 60° Fahrenheit)

Year	Annual Demand 1/	Net Pipeline Imports	LNG Imports	Gas From Coal	Gas From Alaska	Gas From Liquid Hydrocarbons	Domestic Production	Annual Consumption	Un-Satisfied Demand	Reserve Additions	Year-end Reserves	R/P Ratio
1966	17.9	0.4	-	-	-	-	17.5	17.9	0.0	19.2	286.4	16.4
1967	18.8	0.5	-	-	-	-	18.4	18.8	0.0	21.1	289.3	15.8
1968	19.9	0.6	*	-	-	-	19.3	19.9	0.0	12.0	282.1	14.6
1969	21.3	0.7	*	-	-	-	20.6	21.3	0.0	8.3	269.9	13.1
1970	22.6	0.8	*	-	-	-	21.8	22.6	0.0	11.1	259.6	11.9
1971	24.6	0.9	*	-	-	-	22.8	23.7	0.9	12.0	248.8	10.9
1972	26.1	1.0	*	-	-	**	23.8	24.8	1.3	13.0	238.0	10.0
1973	27.7	1.1	*	-	-	**	24.7	25.8	1.9	14.0	227.3	9.2
1974	28.8	1.1	*	-	-	**	24.8	25.9	2.9	15.0	217.4	8.8
1975	29.8	1.2	0.3	-	-	**	24.7	26.2	3.6	16.0	208.7	8.4
1980	34.5	1.6	2.0	0.3	0.7	**	20.4	25.0	9.5	17.0	186.1	9.1
1985	39.8	1.9	3.0	1.4	1.3	**	18.5	26.1	13.7	17.0	175.4	9.5
1990	46.4	1.9	4.0	3.3	2.3	**	17.8	29.3	17.1	17.0	170.4	9.6
1971-1990 Totals	707.6	31.1	38.0	17.3	20.6	**	414.2	521.2	186.4	325.0	-	-

* Very small volumes
** Insufficient data for quantitative projection: unsatisfied demand will be reduced by the amount of SNG actually produced.
1/ Contiguous 48 states.

Figure 1

UNITED STATES GAS SUPPLY-DEMAND BALANCE
(Contiguous 48 States)



*U.S. Natural Gas Reserve Additians (1971-1990) Total 325 Trillion Cubic Feet.

chfieldCompany
North American Producing Division
Eastern Region
Post Office Box 2819
Dallas, Texas 75221
Telephone 214 747 6484

Stuart C. Mut
Vice President

5/17

May 10, 1972

Director, Bureau of Land Management (310)
U. S. Department of Interior
Washington, D. C. 20240

Re: Draft Environmental Impact Statement
Proposed 1972 Outer Continental Shelf Oil & Gas
General Lease Sale, Offshore Eastern Louisiana

Dear Sir:

Atlantic Richfield Company herewith submits its comments on the subject draft environmental impact statement as allowed by the notice appearing on page 6700 in the Federal Register, Vol. 37, No. 64, dated April 1, 1972.

Very truly yours,

S. C. Mut

SCM:nw
Enc.

Comments of Atlantic Richfield Company

Comment 1

In view of the recent court action, one of the most important parts of the impact statement is Article VIII, which deals with alternatives to the proposed action. It is obvious that such article has been extensively revised. However, in order to illustrate such fact and to furnish an index showing the thorough nature of the analysis in Article VIII, the table of contents should be revised as follows:

VIII. ALTERNATIVES TO THE PROPOSED ACTION	Page
A. Hold the Sale in Modified Form	100
B. Withdraw the Sale	101
1. Increased oil imports	103
a. Mandatory oil import program	105
b. Relationship of oil from the proposed OCS sale to foreign imports	120
c. Potential environmental impacts	126
(i) Increase in ship traffic	127
(a) Intentional discharge	128
(b) Accidental discharge	128
(c) Casualty analysis	129
(ii) Terminal requirements	130
(iii) Off-loading facilities	130
(iv) Pollution potential at loading site	130
2. Increased onshore oil and gas production	131
a. Description of the alternative	131
b. Environmental impact - lower 48	138
(i) Impact on air quality	138
(ii) Impact on water quality	140
(iii) Impact on land quality	143
(iv) Impact of operation	147
c. Relationship to Alaska North Slope Oil	150
d. Advantage of the alternative	150

3. Increased nuclear power 153
a. Description of the alternative 153
b. Environmental impact of the alternative 154
(i) Uranium mining and milling 155
(ii) Power plant construction and operation 158
(iii) Transportation 161
(iv) Fuel reprocessing and high level waste storage 162

4. Increased use of coal 165
a. Description of the alternative 166
b. Use of coal as a solid fuel 171
c. Production 174
(i) Underground mining 174
(ii) Open pit mining 182
d. Transportation 190
(i) Systems 190
(ii) Environmental impact 194

5. Increased hydroelectric power 200

6. Modification of FPC natural gas pricing 205
a. Description of the alternative 206
b. Possible impact of the proposed alternative 206

7. Modification of market-demand prorationing system 208
a. Description of the alternative 209
b. Environmental impact 212

8. Oil shale production 215
a. Description of the alternative 215
b. Production from oil shale deposits 217
(i) Subsurface mining 217
(ii) Surface mine development 220
(iii) In-situ development 224
c. Processing oil shale into oil 225

9. Reduction in demand 241
a. Discussion of the alternative 241
b. Potential environmental impact 246

C. Delay Sale 249

You will note that we have included "Reduction in demand" as alternative number 9 under (B) Withdraw the Sale.

Comment 2

On page 15, the general summary of environmental impacts which might result from OCS oil and gas operations is misleading in that most of the impacting factors discussed are temporary. The chart on page 15 may cause the reviewers to overlook the temporary nature of such factors. As a result, we suggest that the following be substituted on such chart:

1. The principal type of relationship between impacting and impacted factors is indicated by (+) positive impact or (-) negative impact. In some relationships, both positive and negative relationships are possible; in these cases, the type of relationship considered dominant is shown. Also, as shown on Page 47, many of these impacting factors are temporary in nature.

Comment 3

On page 44, reference is made to 8,840 completions offshore Louisiana, whereas on page 81, reference is made to 8,789 completions. We realize the difficulty of determining this figure with exactness but we suggest that, insofar as possible, all figures coincide throughout the document.

Comment 4

On page 47, it is pointed out that structures would remain for the productive life of the leases which average about 20 years. In view of such fact, the second paragraph on page 47 should be supplemented throughout to emphasize that the statements therein are as to a temporary period and are not as to a permanent condition. For example, the first sentence could read as follows: "Under some conditions, structures have a temporary adverse effect on commercial fishing activities."

Comment 5

On page 50, the first full paragraph deals with the fact that 16.5 square miles of marsh are being destroyed each year, etc.

It should be noted that accretion to the marshlands is a naturally occurring and continuing process, and that this natural accretion reduces the net amount of marshland being altered or destroyed.

Comment 6

On page 71, third paragraph, the word sheer (shear) should be deleted.

Comment 7

On page 75, the first line of paragraph No. 1 Plans should read as follows: "1. Plans: Operating plans must be submitted by operator and approved by the Geological . . ."

Comment 8

On page 87, in the last paragraph, the word "and" should be deleted from the first line so that it reads as follows: "Moreover, an industry - cooperative venture for oil spill clean up . ."

Comment 9

On page 101, second line, the words "from leasing" should be replaced by "for leasing". The words "lead to" should be deleted from the fourth line and the word "require" should be inserted.

Comment 10

On page 101, the list of alternatives should include:
9. Reduction in demand.

HUMBLE OIL & REFINING COMPANY

POST OFFICE BOX 2180 • HOUSTON, TEXAS 77001

EXPLORATION DEPARTMENT
EASTERN MARINE DIVISION

C. S. FLEISCHMANN
MANAGER

May 11, 1972

Environmental Impact Statement
Proposed OCS Oil & Gas Lease Sale
Offshore Eastern Louisiana

Director,
Bureau of Land Management (310)
U. S. Department of the Interior
Washington, D. C. 20240

Gentlemen:

In response to your invitation published in the Federal Register, Vol. 37, No. 64 - Saturday, April 1, 1972, we have reviewed the Draft Environmental Impact Statement and advise as follows.

In our opinion, it is most thorough and should be adequate under the law. We recommend that you publish it in final form as soon as possible and hold the lease sale at the earliest practicable date.

Yours very truly,

C. S. Fleischmann

C. S. Fleischmann

CSF:dc

THE LOUISIANA LAND AND EXPLORATION COMPANY

SUITE 1200 - 225 BARONNE STREET

P. O. BOX 60350

NEW ORLEANS 70160

CIN G. PHILLIPS
PRESIDENT

May 12, 1972

Director, Bureau of Land
Management (310)
United States Department of
the Interior
Washington, D. C. 20240

Gentlemen:

Reference is made to a notice appearing in the Federal Register of Saturday, April 1, 1972, Volume 37, Number 64, concerning a proposed Outer Continental Shelf Lease Sale off Eastern Louisiana, and a draft environmental impact statement relating to some 78 tracts proposed for leasing. The tracts being considered are the same as those previously offered at a sale held in December 1971, which sale was cancelled and all bids returned unopened.

The Louisiana Land and Exploration Company previously supported the offering of the tracts for leasing and gave adjunctive testimony at the public hearing held in New Orleans in September of 1971. We again urge that the 78 tracts be offered for leasing at an early date.

The draft environmental statement identifies certain energy sources as alternates to OCS leasing in supplying our energy requirements. A critical examination of these alternate sources indicates that although each can be expected to contribute to some degree in supplying future energy needs, at the present time, they are either unavailable in sufficient quantities or are economically unjustifiable or environmentally inferior under present technology.

Continued access to the OCS in the form of regularly scheduled lease sale is essential if we are to be assured of adequate energy supplies that are secure as to source. We therefore favor the proposed leasing of the 78 tracts Offshore Eastern Louisiana.

Very truly yours,

John G. Phillips

SKELLY OIL COMPANY
P. O. BOX 1650
TULSA, OKLAHOMA 74102

EXPLORATION AND PRODUCTION
JUDD H. OUALLINE
VICE PRESIDENT

May 12, 1972

Director, Bureau of Land Management (310)
U. S. Department of The Interior
Washington, D. C. 20240

Dear Sir:

We support mineral leasing of the Outer Continental Shelf and urge that the tentative five-year leasing schedule be followed:

We thank you for the opportunity to respond to the issues in the draft of the Environmental Impact Statement for the proposed OCS Oil and Gas General Lease Sale, Offshore Eastern Louisiana. Our comments are addressed to the issues in this draft.

1. Description of the Proposal

Definitive plans must be made now and adhered to if we are to solve our energy requirements for the nation's short and long term needs. Crude petroleum and natural gas will continue to be the two highest priority energy materials in our total demand requirements for the period 1970-1985. The Gulf of Mexico, and in particular, the Outer Continental Shelf of Louisiana, offers one of the most fertile hunting grounds for this energy supply. The varied and diverse users of this area are not incompatible to exclude any one industry, or to curtail its activity. The mineral industry is aware and has demonstrated the protective role it must play in sharing the environment.

II. Description of the Environment

The area of the proposed sale, with its geological structure, weather patterns and hydrography, has made it the home for a multitude of species of marine, water fowl, fur animals and other wildlife. Also, it possesses the quality of water which makes it highly attractive for outdoor recreation. At the same time, the Gulf of Mexico is

one of the most prolific oil producing areas in the world. Through technology and experience of the mineral industry, the marine, plant and wildlife can be protected and allow this industry to share the area as a user.

III. Environmental Impact of the Proposed Sale

The desire of the mineral industry is to operate in harmony with all users of the Outer Continental Shelf and without any pollution of the environment. This industry has operated in the Gulf of Mexico since 1947 with only minimal pollution and a record of quickly containing and disposing of pollution when it has occurred, with a minimal effect on the ecosystem. The goal of the industry is the elimination of all incidents of oil spills; however, the record of low incidence is evidence of the industry's efforts to achieve this goal and share the responsibility of protecting the environment.

IV. Mitigating Measures Included in the Proposed Action

The Code of Federal Regulations and OCS Orders govern the conduct of all stages of mineral operations, exploratory and development drilling, production, transportation and abandonment. These procedures, along with the corresponding enforcement powers, will permit operations of all kinds, with a low order of environmental risk.

V. Unavoidable Adverse Environmental Effects

The draft of the Environmental Impact Statement, covering the proposed sale, sets forth that there has not been any documentation, as a result of oil spills, of pollution effects on the marine environment in the Gulf of Mexico. This one singular fact should be evidence of the industry's efforts to operate without any adverse effect on the environment in the Gulf of Mexico and support mineral leasing.

VI. Relationship between Local Short-Term Use and Maintenance and Enhancement of Long-Term Productivity

The Short-Term use should be directed to the extraction of oil and gas from those tracts, proven to be economically productive. The mineral industry recognizes and respects the concurrent rights of others to use the Outer Continental Shelf and their exploratory and development drilling, production and transportation will not be in disregard to preserving these rights for Long-Term productivity. Preservation of these rights can be assured through the regulations and orders governing the mineral industry.

VII. Irreversible or Irretrievable Commitment of Resources

A major irreversible or irretrievable commitment of resources is the withdrawal of oil and/or gas to be used as a source of energy by the people of the United States. The commitment of these resources should have only a minimal irreversible or irretrievable effect on the resources to be used by the other users of the Outer Continental Shelf. The industry has already demonstrated that it can live compatibly with other users and without interference with their use or damage to the environment.

VIII. Alternatives to the Proposed Action

The alternatives to the proposed sale are: a modified sale, withdrawal of the sale, or to delay the sale. The results of a modified or delayed sale would further our energy crisis rather than serve as alternatives. The withdrawal of the sale and the substitution of oil and gas production from the Outer Continental Shelf by increasing oil imports, onshore oil and gas production and other energy sources, is not a realistic approach for the Short-Term demand. The increased production of other energy sources and oil imports are supplemental sources rather than substitutes to the Outer Continental Shelf oil and gas production, which will be required to meet our ever increasing energy demands.

Very truly yours,

SKELLY OIL COMPANY

Judd H. Oualline

Judd H. Oualline

JHO:pod

CITIES SERVICE OIL COMPANY

Cities Service Building
Box 300
Tulsa, Oklahoma 74102

April 28, 1972

Bureau of Land Management (310)
U. S. Department of Interior
Washington, D. C. 20240

Attention of the Director

Gentlemen:

Re: Environmental Statement
Proposed Outer Continental Shelf General
Oil and Gas Lease Sale
Offshore Eastern Louisiana

This letter is in response to the invitation to comment on the draft environmental statement relating to the proposed Outer Continental Shelf General Oil and Gas Lease Sale covering 78 tracts located in the Gulf of Mexico Offshore Eastern Louisiana as set out on Page 6700, Federal Register, dated April 1, 1972, Volume 37, No. 64.

Cities Service Oil Company at the public hearing held in New Orleans, Louisiana, on September 8 and 9, 1971, presented oral testimony in support of the proposed sale covering these same tracts, and also filed a written statement in support thereof, being our letter dated September 8, 1971, copy of which is attached for ready reference.

Cities Service Oil Company hereby confirms the statement reflected by the attached letter.

The time lag between a scheduled and subsequently held sale and the actual commencement of the marketing of production is of such duration that it is paramount in the implementation of an orderly exploratory program to have accelerated offshore lease sales. In the recent past, the stop-and-go cycles of leasing activity have been both costly and expensive to the exploration companies and the government.

Again we wish to emphasis our desire for complete compliance with all regulations, rules and orders to preserve the natural environment

through continued research, new design innovations, and improved operational techniques, and continue to pledge our efforts to improve the natural surroundings and ecology at every practical opportunity.

In summation, we commend and encourage you to press vigorously for regularly scheduled sales and offer no critical comments or suggestions for change in the published draft environmental statement.

Very truly yours,

Jack Phillips

JACK PHILLIPS
Area Exploration Manager
Southern

JP:ct:vm
Attachment

CITIES SERVICE OIL COMPANY

800 Main Building
Houston, Texas 77002
Telephone: 713-224-8631

September 8, 1971

The Honorable Rogers C. B. Morton
The Secretary of the Interior
Washington, D. C. 20240

Re: Proposed Offering of Oil and Gas Leases, Outer Continental Shelf off Eastern Louisiana

Dear Sir:

Thank you for providing us the opportunity to comment on the proposed oil and gas Lease Sale of offshore Eastern Louisiana tracts.

We commend and vigorously support your action. It is our firm opinion that such leases should be offered for sale.

We strongly request and urge that the offering of oil and gas leases covering the Outer Continental Shelf lands of the United States continue on a frequent and periodic basis. This will provide an orderly continuance of exploration and development with resulting continuity of a critical energy supply during this period of spiraling demand and evident shortage. This will enable the United States to maintain a strong domestic source of necessary energy for security, economic, and total desirable environmental purposes.

Our policy dictates that all reasonable operational and procedural safeguards will be utilized to reduce the possibility of mishaps to an absolute minimum.

We not only assure compliance with all regulations, rules, and orders to preserve the natural environment but, in addition, through continued research, new design innovations, and improved operational techniques, pledge our efforts to improve the natural surrounding environment and ecology at every practical opportunity.

We are convinced that, overall, the environment and ecology of our country will be enhanced by the sale and development of these tracts and other tracts to be offered at future sales.

Very truly yours,

Jack Phillips

JACK PHILLIPS
Manager of Exploration
Southern Region

JP:ct

NATIONAL PUBLIC LANDS TASK FORCE

NEVADA OUTDOOR RECREATION ASSOCIATION, INC.

• Honorary Life Members •
965 - Chas. S. Watson, Jr.

1966 - George Kell
Sparks, Nevada
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1967 - Anthony D. Rosso
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1969 - Sumner L. Evans
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70 - Dr. Vincent P. Gianella
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1971 - Dr. David L. Lyon
Mt. Vernon, Iowa

• In Memoriam •

George Kell
Sparks, Nevada
George Lund
Unionville, Nevada
Charles Rago
Sparks, Nevada

April 27, 1972

Burton Silcock
Director
Bureau of Land Management
U.S. Dept. of the Interior
Washington, D.C. 20240

Dear Mr. Silcock:

Attached is our comments on the environment impact statement concerning the draft environment impact statement considering action to allow 78 tracts on the Outer Continental Shelf lands for oil and gas leasing.

We sincerely hope this commentary will be given adequate consideration before a decision is reached concerning the proposed sale of leases as announced in the Federal Register, page 6700, April 1, 1972. This organization protests the action for the reasons cited in the attached statement—which in its amended form had not appeared in previous NEPA statement of 1971. We wish this letter and attached statement to be incorporated into the hearing record and duly incorporated into the final environment impact statement.

Sincerely,

Charles S. Watson Jr.

Charles S. Watson, Jr.
Director
P.O. Box 1245
Carson City, Nevada 89701

Attachments(2)

THE TIDELANDS CRISIS

In 1953, Congress passed the Outer Continental Shelf Lands Act, which authorized the Secretary of the Interior to grant leases, at his discretion,[1] by competitive bidding on the submerged lands of the Outer Continental Shelf. The purpose was, ostensibly, to give the Federal and certain state governments control of offshore oil and gas drilling, development—and reap a potent source of revenue. Since the offshore oil boom started, just after the close of World War II, about 53 companies have established over 7,000 drilling rigs on the tidelands(as of 1968).

The first indication, that encouraging such offshore activities may have been a serious mistake, came with the notorious Santa Barbara Channel oil spill in early 1969. A short time later, three massive oil spills ravaged the tidelands and estuaries of the Louisiana coast. The U.S. Coast Guard, which had been unobtrusively—but comprehensively—monitoring this oil spillage, had recorded an average of more than 300 spills a year between the mouth of the Sabine River and the outer Mississippi Delta. The Coast Guard was prohibited by the Executive Branch from any enforcement activity on the tidelands(while the opposite was true on the Great Lakes, particularily Lake Erie). They were permitted, however, to continue recording the pollution and report it to "higher authority". In spite of national impatience at the wanton spillage—which was obviously beyond government control—the incidents of spillage along the Louisiana coast during the first quarter of 1971 climbed to 370! Nearly 100 of these were of the "serious" variety. The Interior Department admitted there were an additional 299 oil slicks in the Gulf of "unknown origin"(it might be pointed out that one major spill, since attributed to Humble Oil[2] by the Coast Guard at Grand Isle, La., was also classified by the government as an oil slick of "unknown origin").

In mid-1971, in spite of this uncontrolled pollution, the Interior Department announced 19 new offshore tracts that were to be opened to oil drilling. These tracts would add 59,425 acres to the approx. 3,850,000 acres presently under federal lease on the tidelands of Louisiana alone. The Federal government's Environment Impact Statement, prepared by the Bureau of Land Management, acknowledged that possible additional dangers would be posed to Gulf biosystems, wildlife and fishing—but urged that more oil drilling be (cont.

[1]-has been modified by new requirements of the Environmental Protection Act(NEPA)of 1969.

[2]-after one 1970 spill which blackened the beaches of Grand Isle, the Coast Guard reported that Humble Oil sent in a cleanup team and a considerable array of equipment to clean up the hundreds of scattered oil slicks, but disclaimed any responsibility for the spill. The Interior Department refused to investigate and fix responsibility.

permitted, because of the "pressing need for new sources of (fossil) fuel". The government--under intense pressure from the oil industry and influential oil-allied figures in the Congress, Executive Branch and state governments(those affected by the OCSL Act)--concentrated on minimizing the deleterious effects of the spills, contending: "no proof existed that these oil slicks had an adverse effect on the offshore environment". Yet, their own Impact Study admits research into this aspect has barely begun--and, in the face of the worst outbreaks of "red tides" ever seen in the Gulf, during 1971.

Of significance is the Interior Department's own assessment of the fragile ecological systems on the Gulf tidelands. These are described: as high energy systems in which the naturally generated energy supply maintains a large and diverse population of plant and animal life. The fortunate combination of warm water temperatures, shallow depths, and the rich nutrient systems of the estuaries and coastal marshes makes the Gulf of Mexico the most productive fishing region in the United States. Unfortunately, the quality of fish is on the decline--and there have been massive fish kills and destruction of vital oyster beds. In 1970, suits against oil interests and drillers, by fisheries along the Gulf, exceeded one-half billion dollars in alleged losses. Yet, in the government's Environment Impact Statement hearings, oil companies and drillers inserted statements flatly declaring no harmful effects on fishing, wildlife or the offshore ecology.

The government's impact statement showed an enormous willingness to tolerate ever ecalating serious violations of Federal law and a dangerous insensitivity to the threat this activity posed to the offshore environment. The government's attitude seems to be:--what we don't know can't hurt us--so, pollution or not, full speed ahead with the drilling. Their statement clearly indicated there would be more offshore drilling than ever before--in spite of obvious dangers, based on cause & effect relationships. The only thing that would cause the government to call a halt, apparently, would be the occurrence of a catastrophe.

C S Watson Jr

CHARLES S. WATSON, JR.
REPRESENTATIVE-AT-LARGE

NATIONAL PUBLIC LANDS TASK FORCE

P. O. BOX 1245
CARSON CITY, NEVADA 89701

SHELL OIL COMPANY
2900 VETERANS MEMORIAL BOULEVARD
P. O. BOX 127
METAIRIE, LOUISIANA 70004

R. J. O'BRIEN
GENERAL MANAGER
OFFSHORE DIVISION

May 15, 1972

RECEIVED
BUREAU OF LAND MANAGEMENT
COMMUNICATIONS UNIT
MAY 18 1972
AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

Director,
Bureau of Land Management
U. S. Department of the Interior
Washington, D. C. 20240

Dear Sir:

Concerning the proposed 1972 OCS Oil and Gas Lease Sale, Offshore Eastern Louisiana and the Draft Environmental Impact Statement prepared pursuant to Section 102 (2) (c) of the National Environmental Policy Act of 1969, Shell Oil Company submits the following comments concerning the Draft Statement.

We endorse the tentative five-year leasing schedule proposed by Department of the Interior (Attachment A - Draft Environmental Impact Statement). Implementation of this schedule is a major first step for the orderly development of the resources of the OCS. We believe for these offerings to make a more significant contribution toward improving domestic reserves, sale sizes must range from one to two million acres, conditioned on the state of geologic knowledge in the particular sale area. Attachment I is our recommended sale schedule, which also indicates sale size in millions of acres. Attachment II is our recommended schedule for environmental hearings. We believe that the timing between the announcement of a hearing and the hearing is adequate. In order for industry to prepare properly and most economically for a sale, it is vital to know the specific tracts at least a year in advance of the sale date. The competitive bidding approach for leasing acreage, regardless of the amount of acreage offered, will establish the fair market value of leases. Technology relating to safety and environmental protection is available now. Therefore, we feel that there is no justification for further delays in implementation of the tentative sale schedule.

A tabulation of Environmental Impacts that might result from OCS oil and gas operations is shown on page 15. We think this chart is misleading as presently constructed and should be revised. We believe the "impacting factors" are less negative and much more positive than reflected in this tabulation. For example, platform installation, pipeline construction and the building of storage facilities all have a positive impact on the regional economy. No "impacting factor", positive or negative, was shown in this category. Additionally, debris is shown to have a negative effect on practically all "impacted factors". Yet on page 46, the statement is made "Therefore, little or no impact on the environment from debris would be expected from the development of the proposed lease offerings." Also, there appear to be important "impacted factors" such as national security and the nation's air quality that have been omitted.

5 / 2

In Section II, subparagraph E, the inclusion of recreation resources in locations completely foreign to the proposed sale area is not compatible with the intent of the section to discuss the environment relative to the proposed sale acreage. We recommend that the discussion be limited to only those resources that could reasonably be expected to be affected by the sale.

Under subparagraph G, Item 1, in the same section, the discussion suggests that sport fishing has not been altered by the presence of offshore structures in the Gulf of Mexico. The fact that offshore Louisiana is one of the world's prime sports fishing areas is directly attributed to these platforms. This was attested to by numerous witnesses at the public hearing held in New Orleans on September 8 & 9, 1971 Therefore, we strongly suggest that this item be revised accordingly.

From the manner in which the material in Item 4 of subparagraph G, Section III, is presented, the net effect is quite negative. Yet the actual data does not support such conclusions. We recommend that the item be revised to more accurately reflect actual experiences to date. Examples of such areas are:

1. Qualification of the results of the Allan Hancock Foundation study on the Santa Barbara spill prior to presenting the study conclusions is not necessary since the study's conclusions are self-qualifying.

2. However, the presentation of Dr. Blumer's work concerning the Buzzards Bay spill needs qualification. That spill involved an entirely different type of petroleum (No. 2 fuel oil) from the natural crude oil that would be involved in an open water spill resulting from OCS operations. Also, it occurred in a restricted area and the situation was complicated by a winter storm. Additionally, more recent information from the Woods Hole Oceanographic Institution (attached) concludes that biologically the area has now completely recovered.

3. Also, the oil pollution that resulted from the tanker sinkings during World War II should be mentioned. The importance of these events is that despite the tremendous volumes of oil released from the vessels, there was no resultant long-term ecological damage. This point was covered in the presentation made by the Offshore Operators Committee on April 11, 1972, before the Committee on Interior and Insular Affairs of the Senate of the United States, with reference to Senate Resolution 45.

4. In general, by the excessive use of such ambiguous qualifying words as "can be", "may be", "might", etc., many statements could easily be misinterpreted as being more positive than they actually are. We would suggest the use of more precise language to describe known effects, and where such effects are not known, but mainly speculative, the language used should indicate this.

Section VIII, subparagraph A on page 100 discusses holding the sale in modified form by possibly deleting additional tracts. We concur with the assessment in the Impact Statement that none of the tracts pose environmental risks that are "unacceptable".

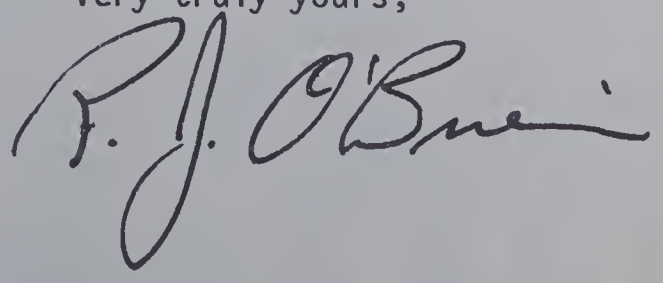
Section VIII, subparagraph B (2a) on page 133 speaks of increasing onshore oil and gas production through research to improve secondary recovery systems. For years the petroleum industry has pursued a continual program of research to improve secondary and tertiary recovery methods. Application of some of these systems have been effective. However, in view of the long history of experience, we expect no short-term breakthrough in technology that will result in significant additional production from existing or new wells.

We believe it has been clearly demonstrated that prorationing has, for all practical purposes, already ceased to function, as no significant spare producing capacity exists in the domestic petroleum industry. Offshore production is currently on MER and all producing states are reaching 100 percent capacity. Therefore, modification of the market demand prorationing systems should not be considered a valid alternative to withdrawing the sale.

We object to use of the word "slick" in Figure 5, page 260. Sheen, rainbow, and slick are all terms used to denote the relative thickness of oil films. For example, one half barrel oil per square mile of water surface may result in a sheen that is barely visible under most favorable light conditions, while thirty barrels of oil per square mile will give the appearance of a slick with a definite dark brown or black color. Figure 5 depicts the results of a remote sensing survey conducted on January 13, 1971, which cannot be confirmed by visual observation, since the daily surveillance flight (U. S. Coast Guard, USGS, EPA, and Shell) was cancelled on January 13, 1971, due to inclement weather.

In summary, we agree that all tracts offered pose some degree of pollution risk to the marine environment; however, safety technology, regulations, inspections, enforcement and contingency plans have all been strengthened to mitigate environmental risk. Therefore, we recommend that the proposed sale be held at the earliest possible date.

Very truly yours,



Attachments

TENTATIVE SCHEDULE — OCS LEASING

SALES	1971				1972												1973												1974												1975											
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TENTATIVE SCHEDULE — OCS LEASING

SALES	1971				1972												1973												1974												1975											
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(1.5) SALE SIZE, M ACRES

SHELL OIL COMPANY
SOUTHERN E & P REGION

ATTACHMENT 1

Pipelines Are Safer Than Tanke

This is in reference to your [illegible] about the effects of oil pollution on the [illegible] of lobsters, in your letter of January 7th. Since we have received several inquiries of this type, I am answering your letter in detail.

We do not have any completed publications on our current studies of the effects of oil on lobsters. Possibly you were referring to a recent article by NEWSWEEK which, unfortunately, misquoted our scientist. Although oil does appear to have an effect on lobster behavior, it is not nearly as pronounced as this article stated. The present facts concerning the oil/lobster situation are as follows:

Tank Studies - We have found that as little as 1 milliter oil, per 100 liters of water in a small aquarium will cause lobsters to slow down their feeding response and become somewhat more agitated and disturbed. They also show some aggressiveness toward other lobsters. We do not know whether these effects are temporary or permanent, nor do we know how the lobsters would respond in an open sea environment where they could escape the oil. None of the lobsters became sick or died from the oil at these low concentrations. Our tests are continuing in some detail under the sponsorship of the office of Sea Grant, of the National Oceanic and Atmospheric Administration of the Department of Commerce. We will be glad to send you a report when the work is completed.

Field Observations - We recently completed a two year study of the West Falmouth Oil spill which was partly sponsored by the Environmental Protection Agency. As you may recall, a barge spilled 400 tons of oil along West Falmouth coast in Buzzards Bay, back in September 1969. At the time of the spill a local lobster fisherman, George Sampson, had pots all over the bay.

The spilled oil was a number two fuel oil, equivalent to the kerosene fraction of crude oil. Crude oils are made up primarily of hydro-carbons of three types, paraffins - which are relatively non-toxic, naphthenes or cycloparaffins - which are only mildly toxic, and aromatics - which are very toxic. This difference in the toxicity of crude oil fractions causes a problem for microbiologists who are trying to develop bacteria that will eat oil in the natural environment. Apparently, the bacteria, being smart, thrive on the non-toxic paraffins but leave behind the aromatics. This tends to cause a concentration of the toxic fractions due to bacterial action. Most crude oils have only about 15% aromatics, but the fuel oil spilled in Buzzards Bay had about 40%, making it much more toxic than the average crude. Furthermore, we had definite evidence that over a period of months the natural marine bacteria in the bay ate the paraffins and further concentrated the toxic aromatics.

"The oil spill caused an almost complete kill....."

The oil spill caused an almost complete kill of all benthic organisms in the area directly polluted by oil. The tide took the oil out about half a mile and it also penetrated the sand out three or four hundred yards to a depth of about thirty feet. This was in the area of Wild Harbor. A large number of lobsters were killed out a distance of about half a mile. Beyond this all lobsters observed by divers and in pots were alive.

It took about 6 months before lobsters began to come back to the area. After 1½ years the lobsters were at about their pre-spill level. Now after 2 years the area has completely recovered. In fact, there are more small benthic species around than prior to the spill, possibly due to somewhat lower levels of their natural enemies. There is still some oil in the sands of the marshes and the bay, but biologically the area has recovered.

Although the W. Falmouth spill wiped out a large number of lobsters locally, it was too small a spill to affect the annual production of the State of Massachusetts. This has varied between 2.8 and 3.2 million pounds over the last 5 years, irrespective of changes in the nature of pollution along our coastline during this period.

Although the W. Falmouth spill was more toxic than natural crude oil, we do feel that a spill from a tanker such as the Torry Canyon, or larger would wipe out the benthic organisms in a shallow coastal area, with complete recovery taking around 1 - 2 years. Deep sea lobsters living more than a half mile from the coastline probably would not be affected by oil spills unless the oil was a very heavy residual crude with a specific gravity greater than that of seawater.

Oil Shipping and Drilling Operations - I would like to comment briefly on the relative merits of bringing foreign oil in by tanker, or drilling for our own oil. In spite of the wishful thinking of some of our super-ecologists, there is no possibility that the American public will give up their automobile or their heavily electrified and heated homes. All realistic evaluations of energy sources clearly show that we will be dependent on the fossil fuels as our major energy source for at least the next 50 years, and probably longer. Consequently, we are forced to decide as to which of the fossil fuels we should use, to do the least damage to our environment and fishing industry. There are only three choices - gas, oil, and coal. Gas by far poses the least hazard to the environment. Gas is made up of paraffin hydrocarbons, methane (C_1) through pentane (C_5). These hydrocarbons are relatively non-toxic. Some strains of bacteria eat them, and others form them in their metabolic processes. Cyclopropane (C_3) also known

as laughing gas, used to be used on humans by dentists, with no ill effects. If by some miracle we could provide all of our power requirements by gas, there would be almost no problems of the environment, or with our fishing industry.

Unfortunately, the gas situation is in a terrible mess because the Federal Power Commission has controlled prices at the well-head in such a way that gas drilling has been discouraged by the oil companies and has been greatly reduced over the last 10 years. Actually, the price of gas to the consumer is like a bottle of milk, the cost is not in the material but in the handling. Gas at the well-head costs 20¢/Mcf. By the time this gas reaches the home owner, it costs $1/Mcf. If more money could be given to the producers and less to the carriers, a lot more gas would be discovered. The Canadians have a lot of gas, but whether they will sell it to us at a reasonable price depends on whether they can open up new reserves in the arctic and the northwest territories. I personally feel there is enough gas to be discovered in the 50 U.S. states and Canada to replace a lot of our oil, but it would take a ground swell of public opinion and some changes in legislative thinking to get the oil companies to look for more gas. The ecologists could help if they would get the government to subsidize gas exploration and encourage gas production. Meanwhile, Boston Edison and other northeast electric companies are willing to pay $1/Mcf for liquified natural gas shipped to the east coast by tanker from Libya. I suspect that we will see a great deal more liquified gasses coming by tanker from foreign ports. Actually, these would pose much less hazard than oil.

Now what about offshore drilling compared to bringing in oil by tankers?

Unfortunately, most of the state and federal legislators in this country who want to ban offshore drilling haven't really thought about the alternatives. The only real alternative is to bring in more foreign oil by large tankers. How do these two hazards compare? Geological studies to date have indicated that oil wells drilled along the northern Atlantic coast will be more than 100 miles at sea. Drilling rigs are set on fixed platforms or drilling ships, both of which can be patrolled regularly by the Coast Guard. Furthermore, drilling operations off the coast are now fully regulated by the U.S. Geological Survey and the Coast Guard. Obviously, this reduces the chances of oil spills. Spills that do occur can be recognized quickly and controlled before they reach shore. This is the most important point in our comparison, namely, that we can control offshore drilling rigs.

In contrast, we have almost no control over foreign vessels with Liberian and Greek flags carrying crude oil along our coastline, as long as they are in international waters. International politics on ocean dumping are still largely platitudes. In the past two years we have had many oil spills hit the Cape and Islands from the open ocean - all unknown as to their origin. If a large foreign tanker dumped oil, or had a collision off your coast there is nothing you could do except sue them. If it is a small oil carrying company, you probably would have trouble collecting. In short, drilling rigs can be controlled, foreign tankers cannot.

I also forgot to add that if oil is discovered in large quantities offshore, our government could require that the oil be brought in by undersea pipeline. Pipelines are far safer than tankers, and since they could be buried in the ocean mud they would pose no hazard to bottom fishing. I might also add that the oil recently discovered by Mobil on Sabel Island, is a light paraffinic oil - exactly the kind that does the least damage to the environment.

In summary, as a consumer of energy and a lover of the sea, I personally would like to see a concerted effort on the part of our government to encourage the search for more natural gas, and encourage greater use of it as a fuel. It has been estimated that by making an all out effort we could discover as much as 1200 trillion cubic ft. of gas in our 50 states, which would be enough to last us for the next 30 years at least. Also I would like to see controlled offshore drilling encouraged in place of the present uncontrolled problem we are facing in importing foreign oil. The foreign oil will also hurt our pocketbooks by upsetting the balance of payments and further devaluating the dollar.

The above is the text of a letter from John M. Hunt, Chairman, Department of Chemistry, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts to Chris Beach, Executive Secretary of the Stonington Planning Board in response to a query by Beach.

Getty

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North American Exploration and Production Division Edd R. Turner, Jr., Offshore Manager

April 28, 1972

Director, Bureau of Land Management (310)
U. S. Department of Interior
Washington, D. C. 20240

Dear Sir:

Please accept our compliments on the recently issued Draft Environmental Statement prepared for the 1972 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Eastern Louisiana.

There are two comments we would like to make on the Statement and would appreciate these comments being taken in the light of suggestions only and not as criticism in any form.

(1) On Page 95 you mention "Oil Pollution Effects on Recreational Resources". For many years I lived in Louisiana, and I am aware that Louisiana's beaches are for the most part inaccessible. From just east of Cameron to Grand Isle, a distance of some 240 miles, there are no roads to the beaches. Possibly this point is not of great importance.

(2) On Page 125, the amount of oil necessary to import to replace the oil which could be possibly developed by this sale, between 109 to 219 thousand barrels is mentioned, but no comment is made on the resulting additional disruption of our nation's balance of payments problem. We think this is an especially important point to include in the final draft.

Please do not hesitate to call on me or the facilities of Getty Oil Company if there is any way we can assist you in preparing for or conducting offshore lease sales.

Yours very truly,

Edd R. Turner

Edd R. Turner, Jr.

ERTJR:sf

Natural Resources Defense Council, Inc.

1600 TWENTIETH STREET, N.W.
WASHINGTON, D.C. 20009
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May 15, 1972

Burton W. Silcock
Director
Bureau of Land Management
Department of the Interior
Washington, D.C. 20240

Dear Mr. Silcock:

Enclosed are comments of the Natural Resources Defense Council on the Bureau's March 31, 1972, draft environmental impact statement on the proposed 1972 OCS oil and gas general lease sale offshore Eastern Louisiana.

Sincerely yours,

Thomas B. Stoel, Jr.

Thomas B. Stoel, Jr.

TBS/mp
Enclosure

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Comments of

Natural Resources Defense Council

on Bureau of Land Management

March 1972 Draft Environmental Impact Statement

on Proposed 1972 Outer Continental Shelf

Oil and Gas General Lease Sale

Offshore Eastern Louisiana

Submitted by:

Thomas B. Stoel, Jr.
Edward L. Strohbehn, J

May 15, 1972

I. INTRODUCTION

The Natural Resources Defense Council, Inc. (NRDC) finds a number of serious deficiencies in the Bureau of Land Management's Draft Environmental Statement on the "Proposed 1972 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Eastern Louisiana" (March 31, 1972). The tracts proposed for leasing are those the Bureau intended to lease on December 21, 1971; this lease sale was enjoined because the Bureau's impact statement was inadequate. [1] Although the Bureau has corrected a major fault of the prior statement by discussing in this draft statement reasonable alternatives to the proposed lease sale, in preparing this statement the Bureau has (1) failed to follow procedures required by the National Environmental Policy Act (NEPA), [2] (2) inadequately discussed the environmental impact of the proposed action, and (3) omitted or inadequately discussed reasonable alternatives to the proposed action and their environmental impacts. These deficiencies are discussed below.

II. PROCEDURE

A. Lack of Hearings

The draft statement notes that public hearings were held on the prior draft impact statement in New Orleans, Louisiana

on September 8-9, 1971 (pp. 250-51), and apparently contemplates no further public hearings. However, the September 1971 hearings are no substitute for hearings on the present statement. Almost 60 percent of the discussion in the present statement deals with alternative energy sources. The prior statement devoted only two and one-half pages to these alternatives. The public, Congress, the President, other Executive Branch agencies, and decisionmakers within the Interior Department itself will be denied the benefits of the information about energy source alternatives which might be developed at public hearings. Executive Order 11514 directs that agency heads shall:

> Develop procedures to ensure the fullest practicable provision of timely public information and understanding of federal plans and programs with environmental impact in order to obtain the view of interested parties. These procedures shall include, whenever appropriate, provision for public hearings, and shall provide the public with relevant information, including information on alternative courses of action. [3]

B. Consultation

The statement declares that a number of federal and state agencies were consulted during its preparation (p.250). Some

agencies which should have been consulted about energy source alternatives are not mentioned; these omissions will be discussed later. Even with respect to the agencies which are mentioned, this general declaration does not show that the Bureau of Land Management satisfied its obligation to consult about alternatives. There is no indication either in the part of the impact statement just cited or in the discussion of the alternatives themselves that the Bureau sought the views of those who actually have authority to put alternatives into effect. Instead, the statement bases its estimates of the feasibility and desirability of energy source alternatives almost entirely on public material issued for other purposes; often this material is considerably out of date. In a number of instances, which will be described in detail later, this failure adequately to consult has led to serious omissions.

III. DISCUSSION OF ENVIRONMENTAL IMPACT

The statement's discussion of the environmental impact of the proposed action is inadequate in a number of respects.

A. Overdrilling

The impact statement does not identify the steps which the Interior Department has taken and intends to take to prevent overdrilling. NRDC has for some time been concerned about the

possibility of overdrilling on these tracts, with resulting increase in harm to the environment, but has been utterly frustrated in its efforts to obtain information on this subject. On October 14, 1971, NRDC wrote to the Director of the Bureau of Land Management, Mr. Burton Silcock, asking for detailed information about overdrilling with respect to the 86 tracts then proposed for leasing. The Bureau did not reply until December 15, 1971, when Mr. Ferguson of the Interior Department Solicitor's Office notified NRDC that because NRDC had filed suit to enjoin the proposed sale on the ground of inadequate consideration of alternatives, "any answer to your letter would now be inappropriate." Efforts to convince Mr. Ferguson that the request for information had nothing to do with the subject of NRDC's suit were unavailing.

NRDC then attempted to get similar information about the preceding OCS general lease sale, which occurred on December 17, 1970. NRDC wrote on February 10, 1972, to the head of the Division of Minerals of the Bureau of Land Management, Mr. Monte Canfield, requesting this information. Mr. Canfield replied on March 7, stating that the Interior Department was gathering the information it needed to respond properly and that NRDC might "expect a detailed reply in the near future." NRDC has heard nothing further from the Department. Copies of these letters

are attached as Appendix A. Almost none of the information requested by NRDC is included in the present impact statement. NRDC reiterates that it should be included so that the public and other interested parties can determine whether adequate steps have been or will be taken to prevent overdrilling.

B. Enforcement

The discussion of enforcement of OCS regulations and lease requirements (pp. 74-85) is incomplete. Considerable space is devoted to describing methods of inspection, but there is no account of the results. The statement should tell, first, the number and nature of violations detected by the inspection process, and the penalties actually imposed for the various violations. Second, the statement should compare the amounts of pollution found to result from violations during similar time periods prior to institution of the new, "more stringent enforcement policy" and afterward.

C. Oil Spills

The statement omits the assertion on page 31 of the prior draft statement that detailed studies concerning the effects of oil spills on the environment are urgently needed, and provides instead a discussion of three studies concerning the Santa Barbara, the Gulf of Mexico Chevron fire, and the Falmouth,

Massachusetts, oil spills. None of these studies amounts to the urgently needed detailed pre-crisis analysis of areas which have a "high oil spill potential" mentioned in the prior draft statement. The statement also ignores the recommendation contained in the first President's report on oil spills (1969) that a major study of the impact of oil spills on the ecology of the OCS is required.

D. Environmentally Hazardous Areas

The statement declares that one area containing tracts included in the proposed offering has been identified as a potentially hazardous area because platforms which may be located in this area could be subject to damage from sediment movement, with consequent pollution (p.71). The statement separately rates the tracts to be leased according to their "potential risk level," based on the possibility of oil spills reaching "high value/critically vulnerable resources" (pp.66-67). The danger of sediment movement was not taken into account in this ranking, and it is not clear whether consideration was given to withdrawing from sale the tracts subject to this hazard.

III. DISCUSSION OF ALTERNATIVES AND THEIR ENVIRONMENTAL IMPACTS

The statement's discussion of alternatives and their environmental impacts is inadequate in a number of respects.

A. Definition of Purpose of Proposed Sale

The statement suggests that the principal purpose of the proposed lease sale is to provide low-sulfur fuel to meet part of the nation's "clean energy" requirements over the next 15 years (p.17). The purpose of the sale is more generally defined as meeting part of the nation's "overall energy requirements" over the same period (p.16). The alternatives discussed focus primarily on meeting energy needs over this 15-year period -- 1970-1985. Some, however, such as development of oil shale, would not provide energy before 1980, while the proposed sale would provide energy as early as 1974.

Although the sulfur content of the coal that might be produced as an alternative is mentioned (pp. 171-174), the discussion does not compare systematically the sulfur content of the various alternative fuels. In fact, the exact sulfur content of the oil expected to be produced as a result of the proposed sale is never revealed. This omission is especially

serious if the principal purpose of the sale is indeed to provide low-sulfur fuel.[4] A much clearer definition of the purpose or purposes of the sale is required to make it possible adequately to assess the alternatives.

B. Delay Sale

The statement considers delaying the sale only pending the development of new technology for increased environmental protection. It is equally important to consider whether the sale should be delayed pending the completion of studies which would assess, for example, ecological impacts of oil spills on the Outer Continental Shelf. The statement should indicate the studies that are needed to eliminate such major gaps in information about environmental impacts and the probable time required to complete such studies, and should discuss the possibility of delaying the lease sale pending completion of the studies and meeting energy needs in the interim by some other means, such as increased oil imports.

C. Hold Sale in Modified Form

The statement does not discuss adequately the alternative of supplying part of the energy which would be produced by the proposed lease sale from another source, or reducing demand by that amount, and leasing only part of the tracts. The Court of Appeals for the District of Columbia Circuit held in January

with respect to these same tracts:

> Nor is it appropriate . . . to disregard alternatives merely because they do not offer a complete solution to the problem. If an alternative would result in supplying only part of the energy that the lease sale would yield, then its use might possibly reduce the scope of the lease sale program and thus alleviate a significant portion of the environmental harm attendant on offshore drilling.[5]

The statement devotes only two-thirds of a page to the possibility of leasing only part of the tracts, and does not discuss this alternative in detail.

This part of the statement is also inadequate because it fails to consider at all the possibility of limiting the lease sale to tracts which are likely to contain only natural gas. The impact statement identifies tracts to be leased according to whether oil or gas is expected to be found, and declares that all gas-producing tracts are expected to produce "wet" gas (pp. 65, 254-55). It must, therefore, also be possible to identify tracts expected to produce only "dry" gas and limit the lease sale to such tracts. Since offshore drilling for and production of oil is much more harmful to the environment than drilling for and production of gas, this alternative would reduce considerably the risk of environmental harm. There is a shortage of gas at current prices, but not of oil. This is particularly unfortunate because use of gas generally causes less pollution than use of

substitute fuels, including oil. Hence, this might be the best alternative to meet our immediate needs for clean energy.

C. Withdraw Sale and Adopt Alternatives Less Harmful to the Environment

1. Increased Oil Imports.

The impact statement fails to discuss import control methods which would provide incentives for increased production and export to the United States of oil from secure areas such as other countries in the Western Hemisphere. These methods would include, for example, area quotas, long-term treaties, or preferential tariffs. It is likely that such methods could produce additional secure imports which would supply more energy than the proposed sale.

The statement suggests that a major problem with increased oil imports is their possible adverse impact on national security. The alternative of storing oil so as to permit unlimited oil imports without security risk is noted (pp. 118-19) but not discussed in detail. The statement fails even to estimate the costs of storing oil in steel tanks or salt domes, or maintaining spare, shut-in capacity in oil fields. The feasibility and desirability of these alternatives cannot be determined without this information.

Nothing in the statement indicates that the Interior Department consulted the Oil Policy Committee -- the governmental

agency charged with making oil import policy -- preparing this part of the statement. Such consultation is essential if the statement is to provide accurate, up-to-date assessment of this alternative rather than a mere guess by the Interior Department about the alternative's feasibility and desirability.

2. Increased Use of Coal.

The discussion of the environmental impact of open-pit mining (pp. 184-85) is inadequate. The reasons given for favoring open-pit mining over underground mining are primarily economic rather than environmental.

3. Modification of FPC Natural Gas Pricing.

The discussion of this alternative is wholly inadequate. The statement concludes that an increase in natural gas prices must be considered "only a partial alternative" to the proposed lease sale "because of the uncertainties of stimulating additional production through increased price, and the potential of substitutability limitations" (p. 205). Neither of these reasons withstands analysis.

The statement's allegation of uncertainty about whether a price rise would stimulate additional production ignores the Interior Department's own impact statement and economic and security analysis concerning the proposed Trans-Alaska pipeline. The pipeline impact statement expresses no doubt that a rise in natural

gas prices would result in increased production.[6] While acknowledging uncertainty as to the exact amount of the production increase, the pipeline statement declares: "it is possible that crude equivalent supplies in a range up to as much as 2 million barrels a day could result from full exploitation of this alternative before 1980."[7] The economic and security analysis of the proposed Alaska pipeline cites evidence from the Ohio intrastate gas market which indicates that the additional supply would be more than two million barrels per day of crude equivalent.[8] This is far more energy than would be supplied by the proposed lease sale. Moreover, the present impact statement does not reveal what studies, if any, the Interior Department has undertaken to resolve this uncertainty as part of its obligation to "study, develop, and describe" the alternatives to the proposed lease sale.[9]

The statement also errs in relying on the non-substitutability of gas for oil in some uses as a ground for rejecting this alternative. This would be a valid reason only if there will be too little oil from sources other than the lease sale to supply all the demand sectors in which gas cannot be substituted for oil. The statement mentions only one such sector: transportation (p. 205). The Interior Department impact statement concerning the proposed Trans-Alaska pipeline estimates that in

1980 the transportation sector will require 11.8 million barrels per day of oil out of a total U.S. consumption of 22.3 million barrels per day.[10] Hence, in 1980 more than 10 million barrels of oil per day will be consumed in sectors where -- so far as the present impact statement reveals -- gas could be substituted for oil. This is far more than the maximum of 150,000 barrels per day of oil expected to be produced by the proposed lease sale.

The statement nowhere indicates that the Interior Department undertook any policy-level consultation with the FPC concerning this alternative. Such consultation is essential; failure adequately to consult may account for the errors and omissions just enumerated. It may also be responsible for the statement's failure to assess or even mention a major policy change proposed by the FPC shortly after the impact statement was issued.[11] The FPC proposal is procedurally complicated, but if implemented it might have the effect of decontrolling the wellhead price of new natural gas supplies, leaving it to be determined by the market. This is the very action which the Alaska pipeline impact statement says could result in additional gas supplies equivalent to as much as two million barrels of oil per day by 1980. Had the Interior Department undertaken the required consultation with the FPC, it surely would have learned of the imminence of this proposal. Now that the proposal has been officially announced,

its significance must be evaluated in detail before the proposed lease sale can go forward.

4. Modification of Market-Demand Prorationing Systems.

There is no indication anywhere in the impact statement that the Interior Department consulted federal and state agencies with authority to implement the alternative. Consultation might have rectified omissions, such as failure to discuss the legal issues involved. Interior should have consulted: the White House, since the President has authority to suspend operation of the Connolly-Hot Oil Act; the Justice Department, which has power to bring anti-trust or commerce clause suits to topple the prorationing system; and the Texas Railroad Commission and Louisiana Department of Conservation, state agencies which operate the system.[12]

5. Reduction in Demand For Energy.

The statement admits that reduction in demand for energy could be a reasonable alternative to the proposed lease sale and is a course of action which has increasing support. The statement analyzes the projected demand by sector, and concludes:

> The transportation sector, which represents over half of the projected demand, would be the area most subject to major demand reductions, since such action would represent but .6 to 1.3 percent reductions in 1980. Whether a reduction of this magnitude or even a major portion thereof, could be accomplished without severe social, economic, quality of life or even certain environmental

> adverse impacts is a subject that would have to be thoroughly analyzed on both a regional and national basis before there would be an adequate basis for the taking of the kinds of actions that would be required. (Pp. 245-246.)

The assertion that a reduction of 0.6-1.3 percent over the next 8 years in the demand for oil for use in transportation would threaten "severe social, economic [and] quality of life . . . impacts" seems absurd on its face. Moreover, the admission that this is a subject "that would have to be thoroughly analyzed" before the taking of any action amounts to a confession that the Interior Department has not fulfilled its duties under NEPA to "study, develop, and describe appropriate alternatives" to the proposed lease sale,[13] in particular the alternative of reducing demand. The statement fails even to describe in detail the "regional and national" analysis which would be required for adequate evaluation of this alternative or to estimate the time which would be needed.

This part of the statement also fails to include a detailed discussion of the ways in which demand -- whether in the transportation sector or elsewhere -- might be reduced. One reasonable method is not even mentioned: taxes, pollution charges, or other measures which would reduce demand for energy by raising its price. There is wide agreement that the price of energy should and will increase. For example, the energy policy staff of the Office of Science and Technology has stated:

> The most generally recognized sources of increase in the overall cost of energy are those resulting from conformance with air and water pollution control regulation. Low-sulfur fuel, stack gas cleaning equipment and cooling towers or ponds are all expected to cost the producers more and result in higher prices. Other environmental considerations, such as esthetics, the preservation of wildlife, and long-term global air pollution problems are more difficult to reflect as costs, but improved esthetics and architectural treatments are already being reflected. And other measures such as undergrounding transmission lines and modified siting practices will cause significant cost increases as we begin to put them into effect.[14]

Increases in the real price of energy will reduce demand. It is possible that socially desirable price increases due to the factors like those mentioned above could reduce demand sufficiently to make all or part of the proposed lease sale unnecessary. The impact statement does not provide the information necessary to evaluate this alternative.

6. Combinations of Alternatives.

The statement does not discuss in detail the combinations of energy sources which might together constitute reasonable alternatives to the proposed lease sale. For example, the statemen dismisses the alternative of a change in FPC gas pricing policy in part because gas is not a substitute for oil in all uses. Even assuming this argument has some validity, it ignores the possibility of combining a change in gas pricing policy with

another alternative, such as increased oil imports. This statement must discuss in detail each such combination of energy sources which might provide a reasonable alternative to the proposed lease sale.

APPENDIX A

NRDC - Interior Department Correspondence

FOOTNOTES

1 / Natural Resources Defense Council, Inc. v. Morton, 3 ERC 1473 (D.D.C. 1971), aff'd, 3 ERC 1558 (D.C. Cir. 1972).

2 / 42 U.S.C. §§ 4321 et seq.

3 / Executive Order No. 11514, § 2(b), 35 Fed. Reg. 4247 (1970). Accord, Council on Environmental Quality, Guidelines § 10(e), 36 Fed. Reg. 7724 (1971).

4 / Moreover, if this is the principal purpose, the statement fails to discuss at all measures which will insure that the oil produced is dedicated to low-sulfur fuel demands.

5 / Natural Resources Defense Council, Inc. v. Morton, 3 ERC 1558, 1563 (D.C. Cir. 1972).

6 / See Final Environmental Impact Statement, Proposed Trans-Alaska Pipeline (hereinafter "Alaska Pipeline Impact Statement"), vol. V, pp. 339-40.

7 / Id., at 339.

8 / An Analysis of the Economic and Security Aspects of the Trans-Alaska Pipeline, vol. III, p. VI-36.

9 / NEPA § 102(2)(D), 42 U.S.C. § 4332(2)(D).

10/ Alaska Pipeline Impact Statement, vol. V, p. 243.

11/ FPC Notice of Proposed Rulemaking, "Optional Gas Pricing Procedure," Docket No. R-441, April 6, 1972.

12/ The statement declares that "advice was solicited" from these state agencies (p. 250), but does not indicate whether they were consulted or what advice, if any, was received from them.

13/ NEPA § 102(2)(D), 42 U.S.C. § 4332(2)(D).

14/ OST Energy Policy Staff, Electric Power and the Environment, p. 47 (1970).

October 14, 1971

Director, Bureau of Land Management
Department of the Interior
Washington, D.C. 20240

Dear Sir:

Natural Resources Defense Council is interested in obtaining information concerning the Interior Department's compliance with its own regulations governing the leasing of offshore drilling tracts, with particular reference to the 86 tracts currently proposed for general lease off Eastern Louisiana. We would appreciate it if you could supply us with the following information not contained in your draft environmental impact statement of last July 26 regarding the proposed general lease sale:

1. A description of the exact procedure by which Interior determined to lease these 86 tracts rather than some other configuration. Was a resources evaluation carried out as provided by 43 C.F.R. § 3301.2? If so, may we obtain a copy? Were nominations received with respect to these tracts, as provided by 43 C.F.R. § 3301.3? If so, who made the nominations and which tracts were nominated? Did the BLM issue call for nominations on its own motion? If so, may we obtain a copy of the Secretary's approval for this action? May we obtain a copy of the recommendations on tract selection and lease terms and conditions that are required to be sent to the Director of the BLM by the Director of the Geological Survey under

43 C.F.R. § 3301.3? May we obtain copies of the reports prepared by the Director of the BLM and by Federal agencies under 43 C.F.R. § 3301.4? Were public hearings held with regard to selection of these tracts, as provided by 43 C.F.R. § 3301.4? May we obtain a copy of the proposed notice of lease offer, together with the special leasing stipulations and conditions prepared under 43 C.F.R. § 3301.4?

2. A precise description of the geological and geophysical information about the area which was available to Interior prior to tract selection, and how it was obtained. Did Interior require potential lessees or other private concerns to turn over to Interior geological and geophysical data obtained under exploration permits or as a result of work done on nearby leases? If so, did the information required to be turned over include geophysical interpretive data, as distinguished from raw, unevaluated data? If interpretive data was not required to be turned over, what was the reason? Did Interior rely in addition or instead on geophysical interpretive data produced by Interior's own staff? Did Interior drill test holes prior to selecting these tracts, to discover the existence and distribution of underlying oil and gas? If not, why not?

NRDC is concerned about the procedures by which Interior intends to prevent overdrilling on these or adjacent tracts, since overdrilling would increase the unfavorable impact on the environment. Could you describe the methods by which Interior intends to prevent overdrilling of these tracts after leasing, insofar as they are now known? In particular, will the Regional Supervisor routinely require unitization of oil and gas fields to prevent overdrilling?

A prompt response to this request will be very much appreciated.

Thank you.

Yours truly,

Thomas B. Stoel, Jr.

TBS/gg

United States Department of the Interior

OFFICE OF THE SOLICITOR
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

DEC 15 1971

Mr. Thomas B. Stoel, Jr.
Natural Resources Defense
Council, Inc.
1600 Twentieth Street, N. W.
Washington, D. C. 20009

Dear Mr. Stoel:

Before the Director of the Bureau of Land Management was able to answer your letter of October 14, 1971, in which you requested information concerning the procedure which the Department followed in proposing tracts offshore eastern Louisiana for lease at a forthcoming general sale, the Natural Resources Defense Council, Inc., filed suit to enjoin the sale. Consequently, any answer to your letter would now be inappropriate.

Sincerely yours,

Frederick N. Ferguson

Frederick N. Ferguson
Assistant Solicitor - Minerals
Division of Public Lands

United States Department of the Interior

OFFICE OF THE SOLICITOR
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

JAN 13 1972

Mr. Thomas B. Stoel, Jr.
Natural Resources Defense
Council, Inc.
1600 Twentieth Street, N. W.
Washington, D. C. 20009

Dear Mr. Stoel:

As you requested, I have reviewed your letter of October 14, 1971, to the Director, Bureau of Land Management, in which you asked a number of questions concerning the Department's compliance with its own regulations governing the leasing of offshore tracts. You suggested in your telephone call in late December that much of your inquiry was of a general nature and was not directly connected with the sale of leases which was set for December 21, 1971. However, it is my opinion that your questions are directed very specifically to this particular sale and the environmental impact statement which are involved in the present litigation between the Natural Resources Defense Council, Inc., and the Secretary of the Interior.

Your Item No. 1 asks for "A description of the exact procedure by which Interior determined to lease these 86 tracts rather than some other configuration". The questions which follow in Item No. 1 all concern this specific sale.

Similarly, your Item No. 2 requests "A precise description of the geological and geophysical information about the area which was available to Interior prior to tract selection, and how it was obtained". Your reference to "the area" is clearly to the tracts offered for lease at the December 21 sale, and all the questions which follow appear to be restricted to the matter involved in the present litigation between the Natural Resources Defense Council and the Secretary.

Finally, your last two questions seem similarly limited to the tracts involved in this particular sale for you refer to methods "to prevent overdrilling of these tracts. . ."

Since your entire inquiry of October 14 appears to concern a matter which is now the subject of litigation between the Council and the Secretary, it would clearly be improper for the Director to respond directly to your letter.

Sincerely yours,

Frederick N. Ferguson

Frederick N. Ferguson
Assistant Solicitor - Minerals
Division of Public Lands

February 10, 1972

Mr. Monte Canfield
Bureau of Land Management
Room 323
Department of the Interior
Washington, D.C. 20240

Dear Sir:

The Natural Resources Defense Council is interested in obtaining information concerning the Interior Department's compliance with its own regulations governing the leasing of offshore drilling tracts, with particular reference to the general lease sale off Louisiana which occurred about December 15, 1970. We would appreciate it if you could supply us with the following information regarding that general lease sale:

1. A description of the exact procedure by which Interior determined to lease the tracts which were leased, rather than some other configuration. Was a resources evaluation carried out as provided by 43 C.F.R. § 3301.2? If so, may we obtain a copy? Were nominations received with respect to the tracts, as provided by 43 C.F.R. § 3301.3? If so, who made the nominations and which tracts were nominated? Did the BLM issue call for nominations on its own motion? If so, may we obtain a copy of the Secretary's approval for this action? May we obtain a copy of the recommendations on tract selection and lease terms and conditions that are required to be sent to the Director of the BLM by the Director of the Geological Survey under 43 C.F.R. § 3301.3?

May we obtain copies of the reports prepared by the Director of the BLM and by Federal agencies under 43 C.F.R. § 3301.4? Were public hearings held with regard to selection of these tracts, as provided by 43 C.F.R. § 3301.4? May we obtain a copy of the proposed notice of lease offer, together with the special leasing stipulations and conditions prepared under 43 C.F.R. § 3301.4?

2. A precise description of the geological and geophysical information about the area which was available to Interior prior to tract selection, and how it was obtained. Did Interior require potential lessees or other private concerns to turn over to Interior geological and geophysical data obtained under exploration permits or as a result of work done on nearby leases? If so, did the information required to be turned over include geophysical interpretive data, as distinguished from raw, unevaluated data? If interpretive data was not required to be turned over, what was the reason? Did Interior rely in addition or instead on geophysical interpretive data produced by Interior's own staff? Did Interior drill test holes prior to selecting these tracts, to discover the existence and distribution of underlying oil and gas? If not, why not?

NRDC is concerned about the procedures by which Interior intends to prevent overdrilling on these or adjacent tracts, since overdrilling would increase the unfavorable impact on the environment. Could you describe the steps which Interior has taken and intends to take to prevent overdrilling of these tracts? In particular, has the Regional Supervisor routinely required or will require unitization of oil and gas fields to prevent overdrilling? If not, why not?

A prompt response to this request will be very much appreciated.

Thank you.

Yours truly,

Thomas B. Stoel, Jr.

TBS/gg

IN REPLY REFER TO:

3310.1 (313)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

MAR 7 1972

Mr. Thomas B. Stoel, Jr.
Natural Resources Defense Council, Inc.
1600 Twentieth Street, N. W.
Washington, D. C. 20009

Dear Mr. Stoel: Tom:

This will acknowledge your letter of February 10, 1972, in which you requested certain information regarding the procedures followed in preparation for the December 15, 1970, oil and gas lease sale offshore Louisiana.

The Department is currently gathering the information needed to respond properly to your inquiry. You may expect a detailed reply in the near future.

Sincerely yours,

Monte E. Canfield, Jr.
Chief, Division of Minerals

GPO 933-864

SHIP SHOAL AREA

LA. MAP NO. 5

SOUTH TIMBALIER-SOUTH PELTO-BAY MARCHAND AREAS

LA. MAP NO. 6

GRAND ISLE AREA

LA. MAP NO. 7

WEST DELTA AREA

LA. MAP NO. 8

WISNER WILDLIFE MANAGEMENT AERA

DELTA NATIONAL MIGRATORY WATERFOWL REFUGE

BRETON ISLAND NATIONAL WILDLIFE REFUGE

CHANDELEUR AREA

LA. MAP NO. 11

CHANDELEUR AREA EAST ADDITION

LA. MAP NO. 11-A

MAIN PASS & BRETON SOUND AREAS

LA. MAP NO. 10

LA. MAP NO. 10-A

MAIN PASS AREA SOUTH and EAST ADDITION

LA. MAP NO. 10-A

SOUTH PASS AREA EAST ADDITION

PASS A LOUTRE GAME AND FISH PRESERVE

LA. MAP NO. 9

SOUTH PASS AREA

LA. MAP NO. 9-A

SOUTH PASS AREA SOUTH ADDITION

LA. MAP NO. 8-A

WEST DELTA AREA SOUTH ADDITION

LA. MAP NO. 7-A

GRAND ISLE AREA SOUTH ADDITION

LA. MAP NO. 6-A

SOUTH TIMBALIER AREA SOUTH ADDITION

LA. MAP NO. 5-A

SHIP SHOAL AREA SOUTH ADDITION

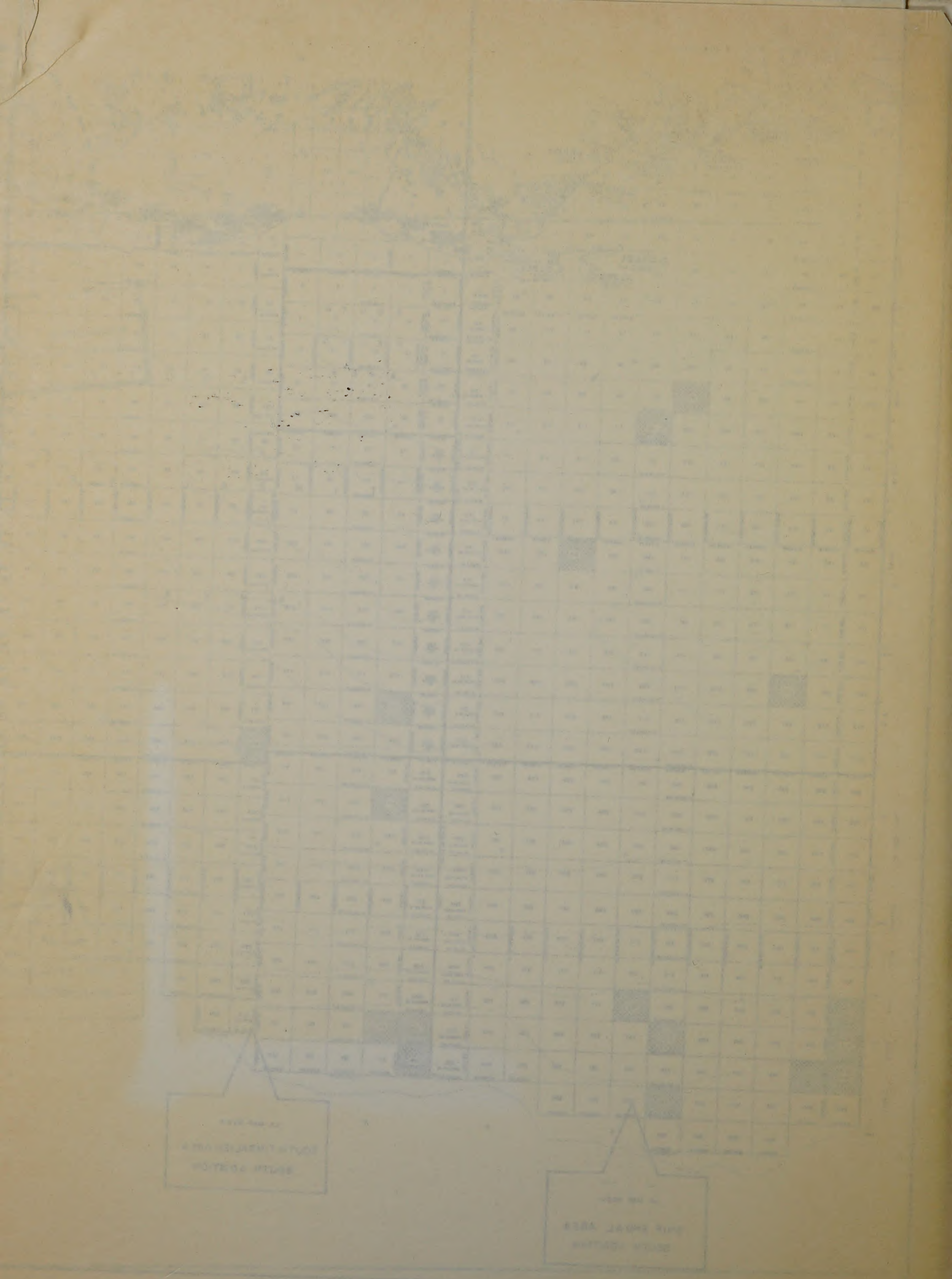
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OUTER CONTINENTAL SHELF

SOUTHEAST LOUISIANA

PORTIONS IN ZONE 2

TRACTS COVERED BY ENVIRONMENTAL IMPACT STATEMENT



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